SCIENCE

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FRIDAY, MARCH 18, 1904.

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MSS. intended for publication and books, etc., intended for review should be sent to the Editor of SCIENCE, Garrison-on-Hudson, N. Y.

THE AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE.
SECTION C, CHEMISTRY.

THE joint meeting of Section C and of the American Chemical Society at St. Louis, December 28 to 31, 1903, was one of the most interesting in the history of the organization. Besides the usual technical papers were those of a physical chemical nature, with several of industrial and commercial value. The general order was varied by one whole session being devoted to a general discussion of valence.

The address of welcome was given by Dr. Frerichs, president of the St. Louis Chemical Society. The response was given by President J. H. Long of the Chemical Society. Dr. Long presided at the Chemical Society sessions and Vice-President Bancroft at the Section C sessions. The address of the retiring vice-president, Dr. Charles Baskerville, was delivered Monday afternoon, subject: 'The Elements: Verified and Unverified.' The address of the retiring president of the Chemical Society, J. H. Long, was delivered Wednesday evening, subject: 'Some Problems in Fermentation.'

The officers for the coming year are:

Vice-President—Wilder D. Bancroft, Cornell University.

Secretary—R. S. Curtiss, Union College.

Councilor—E. H. S. Bailey, University of Kansas.

Members of the Sectional Committee—E. C. Franklin, Leland Stanford; M. T. Bogert, Columbia University; L. P. Kinnicutt, Worcester; L. Kahlenberg, University of Wisconsin; G. B. Frankforter, University of Minnesota.

Member of General Committee—A. Springer.
Press Secretary—G. B. Frankforter.
Local Press Secretary—J. H. Knox.

The papers read were as follows:

The Ternary System, Benzene, Acetic Acid and Water: A. F. Lincoln, University of Illinois, Urbana, Ill.

It was pointed out by Bancroft about ten years ago that the equilibria between two non-miscible liquids and a consulate liquid follow the mass law, and that there are only two sets of equilibria. The application of the law of mass action to the equilibria of these physical reactions has subsequently been demonstrated to hold very closely in the system, benzene, alcohol and water. Waddell concluded from his experiments that the system benzene, acetic acid and water does not conform to the mass law, and that the equilibria can not be represented by expotential formulas. The work on this system has been repeated by the author, who finds that one of the chief sources of error in a work of this kind is the ascertaining of the point of saturation, that is, of equilibrium. Values are given for temperatures 25° and 35°. The data show that the two equilibria can be represented by two expotential formulas and that, as in the case of chemical reactions, the exponent is not a function of the temperature. The conclusion is that for the system benzene, acetic acid and water, the equilibria do follow the law of mass action.

Thermometric Analysis of Solid Phases: Wilder D. Bancroft, Cornell University, Ithaca, N. Y.

When two different solutions of a three-component system belong in the same field and reach the same boundary curve at the same point, the composition of the solid phase in that field can be deduced from the difference in the concentrations of the two solutions. This method has been applied to experiments of Heycock and Neville on gold and cadmium in tin and other solvents, published in 1891. It was shown that the compounds AuCd and $AuCd_3$ are formed. Reversing the process and assuming the existence of AuCd, it is possible to calculate the temperature measurements of Heycock and Neville. This work was done by Mr. E. S. Shepherd and will be published under his name in the February number of the *Journal of Physical Chemistry*.

A Method of Grading Soaps as to their Detergent Power: H. W. Hillyer, University of Wisconsin, Madison, Wis.

When a soap solution is caused to make drops beneath the surface of an oil, the number of drops formed by a given volume of the solution increases with the concentration of the solution. The increase in the number of drops with increase in concentration is a measure of the increased power of the solution to emulsify oily matter and consequently to cleanse. Advantage was taken of this connection between the number of drops and cleansing power, to work out a method of determining the cleansing power of commercial soaps. Certain soaps are efficient for use with cold water but not especially good for use with hot water. The reverse is also true. The method grades soaps for these two kinds of use. The cleansing agent is not the alkali of the soap, but the soap in its undecomposed form.

The Determination of Gliadin in Wheat Flour by Means of the Polariscope: Harry Snyder, Minnesota Experiment Station, St. Anthony Park, Minn.

The various proteids in wheat flour were briefly discussed and the desirability of a rapid and accurate method for the determination of gliadin noted. Methods based upon the use of the polariscope appeared

to offer a satisfactory way for its determination. The quantity of optically active substances in wheat flour, as sucrose, invert sugar and the non-gliadin proteids soluble in alcohol, was found to be small, and if desired corrections could be made for these substances by precipitating the gliadin and polarizing the filtrate, the gliadin could be determined by difference. It was found that if 15.97 grams of flour were treated with 100 c.c. of 70 per cent. alcohol for 18 hours with occasional agitation, and the filtrate then polarized in a 220 mm. tube, the readings on the sugar scale ranged from —4 to —7 according to the amount of gliadin in the sample. It was also found that the polariscope readings multiplied by .2 gave results corresponding with the per cent. of gliadin nitrogen obtained by the usual process. When the results are substituted in the formula $(a)D = -a/PL$, the value obtained for the specific rotation of gliadin was found to be —90. Kjeldahl and Osborne obtained approximately —92. While only tentative standards could be formulated, on account of lack of sufficient data, it would appear from the results obtained that the polariscope offers a rapid and accurate method for the determination of gliadin in wheat.

Factors of Availability of Potash and Phosphoric Acid in Soils: G. S. FRAPS.

In the determination of plant food in soils, chemists have usually considered only that part which is soluble in the common solvents. Solubility is not, however, the only factor of fertility in the soil. The rate of decomposition or weathering of the soil is of great importance, as is also the power of the plants to assimilate. Weathering has received little or no attention. It is known to be of great importance with nitrogenous bodies, but in regard to phosphorus and potash no data can be given. Experiments show that there is a slight increase in both phosphoric acid and potash when the soil is kept moist and a great increase in potash when organic matter is present. This accounts for the necessity of vegetable matter in soils. Another factor is the difference in the solvent powers of plants. A soil may contain sufficient food for one plant, but not enough for another.

Thirty Years' Progress in Water Analysis: ELLEN H. RICHARDS, Massachusetts Institute of Technology, Boston, Mass.

It is hardly possible for the younger chemists to appreciate the benighted conditions in which the early '70's found us. Wanklyn's book, written in 1868, was the first book published on the subject of water analysis alone. Frankland and Armstrong, between 1866 and 1888, made critical examinations of methods, and reached important conclusions as to the meaning of the presence of the various substances in drinking-water.

During this time occurred a bitter controversy over the question whether the whole of the organic carbon and nitrogen or only a certain ratio of the total was important. It must be remembered that at this time chemistry was still young in this country. There were a few laboratories in the better scientific schools and there were a few strong men at work, yet chemistry in general, and water in particular, were far from satisfactory.

My note-book, dated 1872–73, contains, so far as my knowledge goes, the records of the earliest so-called sanitary analyses. About this time the method of reducing to grams was changed to milligrams, and when finally accepted produced astounding results.

The cause of the great discredit to water analysis in the '80's was due to the taking up of the quick and comparatively simple

'albuminoid ammonia' process by inexperienced chemists. Men with little or no training posed and advertised themselves as expert water analysts. What followed can easily be imagined. The public naturally became skeptical, and learned to discredit not only the work of these pseudo-chemists, but also the results of the experts. It was not an uncommon thing, as late as 1895, for samples of water to be sent to four or five different analysts in order to see how widely they differed in their opinions of the same sample. Of course, the fault lay largely with the analysts who assumed that their laboratory tests were all-sufficient.

Great good was accomplished along this line by the Massachusetts Legislature in 1886, resulting in a law entitled 'An Act to Protect the Purity of Inland Waters.' This organization included not only a chemical laboratory, but an engineering, biological and bacteriological staff as well, and the new idea of control of the watersheds and water supplies came to the front in order that selfishness of municipal disposal might be checked out of regard for the general good. This idea has been continued in the various state and municipal laboratories ever since.

At the present time the field of controversy has been somewhat shifted from organic matter to organisms whose pernicious activities are supposed to give rise to the most serious dangers.

A Study of the Nitrogenous Constituents of Meats: H. S. Grindley, University of Illinois, Urbana, Ill.

Object.—To increase by experimental study the present very limited knowledge of the proteids of flesh, in the condition in which they exist in meat as used for food.

Method.—Two samples of lean, raw beef flesh and one sample of cooked beef flesh were extracted successively with the following reagents: Cold water, 10 per cent.; sodium chloride solution, .15 per cent.; hydrochloric acid solution, .15 per cent; potassium hydroxide solution, and lastly hot water. The several forms of proteid and non-proteid nitrogen in each of these extracts were determined.

Results.—The detailed results are given in thirteen tables.

Conclusions.—1. Cooked meat is much less soluble in the above solvents than raw meat.

2. The acidity of a solution of flesh increases upon the coagulation of its proteids.

3. Cold water extracted 3.06 per cent. nitrogenous matter from raw meats and only .27 per cent. from boiled meat.

4. A 10 per cent. solution of sodium chloride extracted from raw meats 6.10 per cent. of proteid matter and only .5 per cent. from boiled meat.

5. A .15 per cent. solution of hydrochloric acid dissolved from raw meat 2.28 per cent. proteid and from boiled meat 2.30 per cent.

6. A .15 per cent. solution of potassium hydroxide extracted from raw meats 2.88 per cent. and from boiled meat 4.84 per cent. of proteid.

7. Hot water removed from raw meats .49 per cent. and from boiled meats 6.24 per cent. proteid matter.

8. Of the total proteid existing in the original raw meats 95.22 per cent. was dissolved by extracting successively with the above-named reagents, while only 50.59 per cent. of the total proteid of the boiled meat was thus made soluble.

Some Double Salts of Lead: John White, Rose Polytechnic, Terre Haute, Ind.

In 1863 the observation was made by Carius (*Liebig's Ann.*, 125, 87) that lead acetate is acted upon by alkyl haloids when heated with them in a sealed tube, using glacial acetic acid as the solvent, and that

a class of compounds is obtained of the general type

$$Pb\begin{cases} x \\ C_2H_3O_2 \end{cases}$$

where x is any halogen. These compounds he designated as the *acetines* of lead.

It is well known that lead sulphate is soluble in alkaline acetates, tartrates, etc., and experiment shows that the halogen salts of lead are also soluble under like conditions. It seems probable that these in passing into solution may form compounds of similar character to those mentioned above.

To test this, experiments were planned, whereby the products of the reaction might be collected and examined. Lead iodide was chosen for the preliminary experiments, because it was found that the products resulting from its solution in acetates and tartrates is white, hence the reaction could be followed by observing the change of color.

The following method of preparation of the salts was adopted: A very concentrated solution of the acetate to be used was first made in alcohol, the strength of which was adjusted for each case, varying from 50 to 95 per cent. To this a few drops of glacial acetic acid were added—otherwise the lead iodide is transformed almost entirely into the basic iodide—and then freshly precipitated lead iodide was brought into the hot solution until it was nearly saturated, the solution filtered and allowed to cool in a vacuum over sulphuric acid.

In each case, upon cooling, well-defined colorless crystals were obtained, which, after draining off and washing with a mixture of strong alcohol and ethyl acetate, were subjected to analysis. In no case, however, was the simple compound

$$Pb\begin{cases} I \\ C_2H_3O_2 \end{cases}$$

corresponding to Carius's salt obtained; instead, the analyses showed that compounds were formed, which may be interpreted as a combination of this with the metallic acetate used. The following salts have so far been isolated and analyzed:

I. $Pb\begin{cases} I \\ C_2H_3O_2 + NaC_2H_3O_2 \cdot \frac{1}{2}C_2H_4O_2, \end{cases}$
melting point (uncorr.) 124–125° C.

II. $Pb\begin{cases} I \\ C_2H_3O_2 + 3NaC_2H_3O_2 \cdot \frac{1}{2}C_2H_4O_2, \end{cases}$
melting point undetermined.

III. $Pb\begin{cases} I \\ C_2H_3O_2 + KC_2H_3O_2, \end{cases}$
melting point 208–208.5° C.

IV. $Pb\begin{cases} I \\ C_2H_3O_2 + NH_4C_2H_3O_2, \end{cases}$
melting point 166–167° C.

V. $Pb\begin{cases} I \\ C_2H_3O_2 + Pb(C_2H_3O_2)_2 \cdot \frac{1}{2}C_2H_4O_2, \end{cases}$
melting point 202–205° C.

They all (with the exception of II.) possess a characteristic crystal form and give fairly sharp melting points. It will be observed that some of them contain acetic acid of crystallization, while others do not, although they were all prepared in a similar manner. When dry they are quite stable, but are decomposed by water or moist air, forming first lead iodide, then the basic iodide. Organic solvents are without action. On account of the insolubility and general inactivity of these substances, it has not yet been possible to determine with positiveness their molecular structure. It is hoped that further investigation may throw additional light upon this point.

The Theory of Valence: G. B. FRANKFORTER, University of Minnesota, Minneapolis, Minn.

Valence followed, as a natural consequence, Dalton's atomic theory and the laws of definite and multiple proportion. The first real expression of the present valency theory was made by Frankland, followed by Kolbe and others, who showed

the new idea was in close accord with facts. Notwithstanding the enormous amount of work and speculation of the past fifty years, the idea of valence remains as mysterious as ever. Whether valence represents certain lines of force as a result of some modified application of chemical affinity, or whether it represents certain electrical charges, remains for the future to determine. The electrolytic dissociation theory and the ionization theory would seem to point to the latter as one of the coming theories. Every one must admit that the present valence theory has been of inestimable value in the development of the science, yet none can doubt the fact that the foundation upon which the whole theory rests is by no means a firm one.

The Theory of Double Salts: JAMES LOCKE, Massachusetts Institute of Technology, Boston, Mass.

The present theory of double salts is untenable. In the development of the double-salt theory during the past thirty or forty years, the tendency has been to represent even the most complex of these double compounds as if the valences of the respective elements were absolutely fixed. This condition of affairs has been brought about largely by the organic chemists who have carried the structural arrangement to the extreme, and many compounds are represented by definite fixed formulas without the slightest shade of reason. The salts of hydroferro and hydroferricyanic acids serve as excellent illustrations. The double salts of platinum, as represented by Remsen in his theoretical chemistry, also show the absurdity of the present theory. In fact, the present double-salt conception is without foundation and must sooner or later fall. The Werner theory comes nearer to a logical representation of the double salts than any theory which has yet been proposed.

Werner's Theory of Valence and the Constitution of Compounds: J. E. TEEPLE, Cornell University, Ithaca, N. Y.

The most common objection to Werner's theory is that it discards the present theory of valence, although Werner himself believes that it is only a logical outgrowth of the valence theory. The development of the present theory since the time of Frankland and Kekule may be summed up as follows: (1) A rise in the valence assigned to each element; (2) the increasing use of compact concentric formulas; (3) the common acceptance of the idea of varying valence; (4) the introduction of space relations in formulas, and (5) the growth of the idea of partial or residual valence. The results of the development along these five lines have been remarkable, notwithstanding the fact that no satisfactory explanations are offered for any of the complex compounds and especially the double salts. In fact, Werner's theory is the first to give a satisfactory explanation of the structural formulas as $CoCl_2 \cdot 6H_2O$, $CoCl_3 \cdot 3NH_3$, $CoCl_3 \cdot 4(NH_3)$, $Fe(CN)_6K_3$ and $Fe(CN)_6K_4$.

To understand Werner's theory three concepts are necessary: (1) Primary valence, (2) secondary valence and (3) coordinate number. By primary valence is understood the idea of valence in the ordinary sense as the power of holding together ions or radicals which usually unite with ions. Secondary valence, on the other hand, only combines substances which can not act as ions and are not equivalent to them. The coordinate number of an atom represents the maximum number of groups or atoms with which it may come into direct contact. This number is definite and unvarying for each element: four for carbon, six for cobalt and most of the metals. The number can easily be determined by its ammonia compounds or similar derivatives.

Following out these three concepts, we are able, for the first time, to express such compounds as $CoCl_3(NH_3)_6$ satisfactorily. Thus, around a central cobalt atom are arranged the six ammonia groups attached to the cobalt atom by secondary valences. They are in the first sphere of influence, and hence the whole complex $Co(NH_3)_6$ acts as a single ion. These six groups are probably regularly distributed around cobalt as the central atom and may, therefore, be represented by an octahedron with an ammonia group joined to each of the six vertices. In the second sphere, and not directly connected with the cobalt atom, lie the chlorine atoms. Being necessarily farther removed from the cobalt atom, we should expect more freedom of action for them than for the ammonia, that is, they would act as ions when the salt is in solution. All this may be briefly represented by the formula $Co(NH_3)_6Cl_3$. It has been experimentally proved that such complex ions as $Co(NH_3)_6$ do actually exist in solution and that, in this particular salt, all three chlorine atoms do act as ions.

Werner's theory also explains many hitherto inexplicable phenomena of the simpler compounds. Why does ammonium chloride, NH_4Cl, dissociate while the corresponding compound methyl chloride, CH_3Cl, its left-hand neighbor in the periodic system, does not? According to the idea given above, the hydrogen in the ammonium chloride would be in the first sphere of the nitrogen, the group NH_4 acting as an ion, while the chlorine would act in the second sphere. The compound should dissociate. It does. In the case of the methyl chloride, there is no dissociation because both the hydrogen and the chlorine are in the first sphere of influence and joined directly to the carbon atom. This same explanation also applies to the oxonium, sulphonium, phosphonium, iodonium and diazonium salts.

It is impossible to explain these molecular compounds by the old theory. The very term 'molecular compound' is proof that the old valence is insufficient.

Various attempts have been made to disprove Werner's theory, but in most cases experiments have proved rather than disproved the theory. This is especially true with regard to coordinate number, which gives to each element a fixed number and secondary valence which has a definite limit. It is not understood that this theory was designed to replace the old valence theory in cases of simpler compounds like sodium chloride or in any case where the present theory is satisfactory. It was only intended as an extension of the present theory.

Solubility of Gold in Certain Oxidizing Agents: VICTOR LENHER, University of Wisconsin, Madison, Wis.

Metallic gold is soluble in such inert acids as sulphuric and phosphoric when heated in the presence of such oxidizing agents as selenic, telluric, nitric and chromic acids, red lead, lead dioxide, nickelic oxide, manganese dioxide and the higher oxides of manganese. Anode oxygen will also readily cause solution of a gold electrode with electrolytes of either acids or alkali, most of the metal subsequently depositing on the cathode. In case of such salts as sodium sulphate or sodium nitrate, very little of the gold passes through or enters the electrolyte, and the gold anode is completely transformed into gold oxide.

On a Method for Preparing Salts with a Definite Number of Molecules of Water of Crystallization: LAUNCELOT W. ANDREWS, University of Iowa, Iowa City, Iowa.

Salts containing a maximum amount of water of crystallization when enclosed in a

tight vessel with a large amount of the same salt in a more or less completely dehydrated condition are, when a condition of equilibrium is attained, converted with precision into a phase containing a definite amount of water greater by one step than that present in the salt used as desiccant. The employment of the method for the removal of mechanically adherent water from highly efflorescent salts, and for the preparation of compounds containing alcohol, benzene or acetic acid of crystallization was also referred to.

An Interesting Deposit from City Water Pipes: E. H. S. Bailey, University of Kansas, Lawrence, Kan.

The soft brown deposit, resembling peat, contained the following percentages: Silica, 13.20; water, 27.62; manganese oxide, Mn_3O_4, 34.07; ferric oxide, 8.04; alumina, 3.29, and therefore, resembles woad. The water itself only contained a minute trace of manganese.

A Method of Determining the Total Carbon of Coal, Soil, Etc.: S. W. Parr, University of Illinois, Urbana, Ill.

The substance is mixed with an excess of sodium peroxide and burnt in the well-known Parr calorimeter. The residue is then mixed with an excess of dilute sulphuric acid and the evolved carbon dioxide measured in a gas burette, the amount of carbon being calculated from the volume of the gas. The amount of carbon in the peroxide used is determined in a special blank experiment. The method gave good results for total carbon in iron, organic compounds, etc.

The Application of Physical Chemistry to the Study of Uric Acid in Urine: F. H. McCruden, Boston, Mass.

The greater solubility of uric acid in urine as compared with pure water is shown to be due to the establishment of an equilibrium between the uric acid and the acid phosphates. Hence the addition of even considerable amounts of alkalies, as compared with the uric acid, does not appreciably influence the solubility of the latter. The interesting details of this paper do not lend themselves to discussion in an abstract.

Investigation of the Bodies called Fiber and Carbohydrates in Feeding Stuffs, with a Tentative Determination of the Components of Each: P. Schweitzer.

The author presented in tabular form the results obtained by approximate methods of determination of 'pure fiber,' fibro-pentosan, pectose, pecto-pentosan, pentosan, sugar, starch and 'indefinite carbohydrates' in a large number of feeding stuffs.

The following papers were also read:

Herman Schlundt: 'The Dielectric Constants of some Inorganic Solvents.'

Hamilton P. Cady: 'Concentration Cells in Liquid Ammonia.'

James Locke: 'The Action of Ammonia upon Solutions of Copper Sulphate.'

Charles Baskerville: 'Phosphorescent Thorium Oxide.'

Charles Baskerville and George F. Kunz: 'On the Action of Radium Compounds on Rare Earth Oxides and the Preparation of Permanently Luminiferous Preparations by the Mixing of the Former with Powdered Substances.' By title.

Charles Baskerville: 'Action of Ultra-Violet Light on Rare Earth Oxides.'

W. D. Bigelow, H. C. Gore and B. J. Howard: 'The Ripening of Apples.'

John Uric Nef: 'Dissociation Phenomena of the Alkyle Haloids and of the Monatomic Alcohols.' Published in *Liebig's Annalen*, Vol. 318, p. 137.

Edward Bartow: 'Synthesis of the Quinoline Series.'

Arvid Nilson: 'The Life of a Barley Corn.'

G. B. Frankforter,
Secretary.

SECTION H—ANTHROPOLOGY.

SECTION H of the American Association for the Advancement of Science held its regular sessions at the fifty-third meeting, which was in progress in St. Louis, Mo., during convocation week. The American Anthropological Association affiliated with Section H. Owing to a meeting of the anthropologists in New York City during the latter part of October, few of the working members were present.

The organization of Section H took place on Monday morning, December 28, immediately after the adjournment of the general session. This session, as well as all the subsequent ones, was held in room 218 of the Central High School. Owing to the absence of the vice-president, Marshall H. Saville, the council granted permission to appoint a vice-president *pro tempore*. Dr. Anita Newcomb McGee was elected to this office. The officers for the meeting were as follows:

Vice-President—Dr. Anita Newcomb McGee (in the absence of M. H. Saville).

Secretary—George H. Pepper.

Member of Council—W J McGee.

Sectional Committee—George A. Dorsey, vice-president Section H, 1903; Roland B. Dixon, secretary Section H, 1903; M. H. Saville, vice-president Section H, 1904; George H. Pepper, secretary Section H, 1904–08; William H. Holmes, F. W. Hodge, W J McGee, Miss Alice C. Fletcher and George Grant MacCurdy.

Member of General Committee—Amos W. Butler.

Officers of the American Anthropological Association:

President—W J McGee.

Secretary—George A. Dorsey.

During the meeting the following members of Section H were elected fellows: Frederick W. Hodge and David I. Bushnell, Jr.

Frank Russell, Ph.D., instructor in anthropology in the Peabody Museum, Cambridge, Mass., died in November, 1903, at the age of thirty-five. He became a member of Section H of the American Association for the Advancement of Science in 1896, was made a fellow at the forty-sixth meeting and was elected secretary of Section H for the forty-ninth meeting, which was held in 1900.

Report of the committee on the death of Dr. Frank Russell:

WHEREAS, The death of Dr. Frank Russell has removed from our ranks one whose career, though brief, was full of achievement and promise; in order to express our appreciation of what he was and what he accomplished, as well as our personal sense of loss through the untimely termination of his labors, we recommend the following resolutions:

Resolved, That in the death of Dr. Russell the association has lost one of its most efficient and faithful workers in the field of anthropology, and one whose industry and patience, through years of physical suffering, will remain a noble example to his co-workers and all who knew him.

Resolved, That copies of these resolutions be sent to his widow and family, and that a copy be placed among the records of the section.

GEORGE A. DORSEY,
GEORGE GRANT MACCURDY,
GEORGE H. PEPPER.

The address of the retiring vice-president, Dr. George A. Dorsey, 'The Future of the Indian,' was delivered Wednesday morning in Room 218 of the Central High School.

Owing to the small attendance and in view of the fact that all the members of the American Anthropological Association present were members of Section H, there was no formal meeting of the affiliating association, the vice-president of Section H occupying the chair throughout the meeting.

The following is a list of papers presented, with discussions, and abstracts:

TUESDAY, DECEMBER 29.

Presentation of Eoliths from England and Belgium: GEORGE GRANT MACCURDY.

Paleoliths from the Quaternary deposits of Europe had a long hard struggle for

recognition, which was freely granted only after Sir Joseph Prestwich's visit to Abbeville in 1859. The eoliths are passing through a similar struggle with increasingly brighter prospects of success. It was also Prestwich who came to their rescue at a critical time. Rutot, of Brussels, is their most powerful living exponent. Mr. MacCurdy made important collections last summer both in Belgium and in southern England. The eoliths found in Belgium came from a series of the oldest Quaternary deposits. The specimens found in patches of old southern drift which cap the highest levels of the Kentish Chalk Plateau are still older. If the chipping on them is artificial, it was done by Tertiary man.

This paper was discussed by W J McGee, who said that much of the material from the region under consideration was of such a character that in many cases it was hard to determine whether the chipping was really the work of man or of natural agencies.

Danish Museum of Archeology: George Grant MacCurdy.

The present system of museums of northern archeology has been in force since 1880. The center of the system is the unrivaled collection of Danish antiquities in the National Museum at Copenhagen, that alone has enough material from which to write a fairly complete account of northern archeology. Its branches are the ten provincial museums. Seven of these are in Jutland —the largest being at Aarhus—and one each in Fünen, Laaland and Bornholm. Each provincial museum receives annually 1,000 kroner ($280) from the state. In return for this subsidy the museums may be called upon at any time to relinquish important specimens that are wanted for the national collection at Copenhagen, and the director of the national collection is *ex officio* advisory director of all the provincial museums. The latter are not allowed to excavate without a permit from the National Museum authorities, and are, of course, reimbursed for such specimens as are given over to the Copenhagen Museum. At the time of Mr. MacCurdy's visit to Denmark, Dr. Sophus Müller, the director of the National Museum, was making his annual tour of the provincial museums.

While the system is, on the whole, satisfactory, it is defective in so far as it tends to discourage competition. There is no incentive to local pride, hence the provincial treasuries are seldom augmented by gifts from private citizens.

The Cahokia and Surrounding Mound Groups: David I. Bushnell, Jr.

Below the mouth of the Missouri, for a distance of some sixty or seventy miles, the Mississippi is bordered on the east by the rich alluvial plain to which the name American bottom is generally applied. Near the center of this area is the largest earthwork in the United States, the Cahokia Mound, which has four terraces and rises to a height of 100 feet above the original surface. Its greatest dimension is from north to south, 1,080 feet; its width from east to west is 710 feet; area at base about fourteen acres. Cahokia is surrounded by a group of more than seventy lesser mounds. The mounds of this group are of two classes, conical and truncated rectangular pyramidal. One and six tenths miles west of Cahokia is a group of five mounds. Extending in a southwesterly direction is a chain of mounds terminating in a group. Twenty-six mounds formerly existed at a place on the bluff opposite these mounds. They were destroyed some years ago and are now covered by houses which form a part of St. Louis. The slope of the bluff eastward from the Cahokia group appears to have been one extensive burial ground.

The name Cahokia applied to the mound group perpetuates the name of an Illinois tribe. There were formerly two groups of small mounds near the center of the western half of Forest Park in St. Louis, the area now known as the world's fair site. These were explored. The average dimensions of the mounds of the smaller group were, diameter 48 feet, elevation 3 feet. Chert, potsherds and charcoal were found on the original surface. They may have been the remains of earth-covered lodges.

George A. Dorsey, in discussing this paper, said that the abandoned villages of the Mandans, Pawnees and other plains tribes had been noted by him, and that the ruins of the fallen earth lodges did not leave a mound, but rather a depression with an enclosing rim.

The Mounds of the American Bottom of Illinois: Report on a Group Heretofore not mentioned and a New Light thrown upon Their Former Use: DR. H. KINNER.

The great group of mounds of the American bottom were described, and their position shown by means of maps. Special attention was given to the Fish Lake group.

The speaker endeavored to show that the earthworks were not of a ceremonial nature, but were built for and used as places of refuge during the time of floods.

Paper discussed by H. M. Whelpley.

The African Pygmies: S. P. VERNER.

At the request of Mr. Verner, W J McGee presented this paper. He stated that Mr. Verner had spent considerable time among the pygmy tribes of Africa and, at the present time, was on his way to that country to obtain a group of these interesting people for the anthropological exhibit of the Louisiana Purchase Exposition. These savages have rarely been taken from their native wilds and the ones to be brought to America will be the first that have ever visited this country.

Instead of having the regular afternoon session in the room of the Central High School, the section voted to accept an invitation of Professor W J McGee to visit the fair grounds and there listen to his paper on 'The Department of Anthropology at the World's Fair.'

Professor McGee's paper was presented in his office in the Washington University building, and was illustrated with maps and later by means of an inspection of the grounds and buildings that are to be devoted to anthropology.

WEDNESDAY, DECEMBER 30.

The Future of the Indian: GEORGE A. DORSEY.

This interesting address was discussed by W J McGee, H. M. Whelpley, H. Kinner, A. B. Reagan, Dr. Anita McGee, R. H. Harper and C. E. Slocum.

The Knife in Human Development: W J McGEE.

The history of the knife was carried back to the time when a water-worn boulder was used instead of a stone with cutting edge. This primitive custom may still be seen among the Seri Indians of Tiburon Island in the Gulf of California and of the mainland. The speaker cited an instance in which a Seri woman was pounding the flesh from the leg of a horse. The implement with which she worked was a rounded stone. In pounding with this hammer it was broken in two, thereby presenting cutting edges that might have been used to advantage. Instead of utilizing this superior form of tool she threw the pieces away and sought another stone with a rounded surface. When the edged tool was first used the natural fractures were no doubt utilized for a long period. Then came artificial chipping with a slow development toward the higher types of cutting implements.

The Torture Incident of the Cheyenne Sun-Dance of 1903: George A. Dorsey.

This paper was in the form of a concise account of the dance, the torture which caused the trouble and the charges made by the agents.

John H. Seager and Mr. White sent individual reports to the Commissioner of Indian Affairs in Washington. They charged that Dorsey and Mooney had paid fifteen dollars to an Indian to undergo torture. Seager had previously charged his superior officer with having revived the sun-dance and that it cost six beeves to renew it. This charge was made before the Mohonk conference. It was never investigated. Dorsey demanded that the Indian Department investigate the charges on both sides. He stated that no money was paid for the dance that he saw, and that practically no torture was undergone.

No session was held in the afternoon. The section was invited by the local committee to visit the Cahokia Mound and the surrounding mound groups, and a number of the members took advantage of the opportunity to visit this wonderful earthwork.

THURSDAY, DECEMBER 31.

The History of an Arickaree War Shield: George A. Dorsey.

The history of this particular shield was traced from the time that the owner died. The shield was stolen by a member of the tribe. It had been willed to the favorite son of the deceased. The son went to his father's grave and saw a vision. In it a bear appeared, and there were various other phenomena such as the presence of lightning. He found the man who had stolen the shield and regained the inner part of the frame. The cover had been thrown away. He painted the shield, using as decorations the symbols seen while watching his father's grave. Thus he obtained good medicine.

Presentation of Ceremonial Flint, and Facts Relative to its Discovery: H. M. Whelpley.

Discussion by George Grant MacCurdy and R. H. Harper.

Archeology of the Afton Sulphur Springs, Indian Territory: R. H. Harper.

In this contribution the preliminary work in the Sulphur Springs was described, leading up to the final cleaning out of this interesting ceremonial spring which contained the deposit of stone implements. He mentioned the fact that the oldest Indians of the region were interviewed and all seemed to agree that it was a place of sacrifice. The absence of arrow points within a radius of several miles would tend to show that hunting was not allowed near the spring. Outside of this area a great many stone implements are found.

The Efficiency of Bone and Antler Arrow Points as shown by Fractured Human Bones from Staten Island, New York: George H. Pepper.

The Indians of Staten Island were of Algonkin stock and members of the Mohegan tribe. Their village sites and implements have always been in evidence, but no burial places of importance were noted until 1858.

The first exploration work was carried on by Mr. Pepper in 1894, followed by explorations for the American Museum of Natural History of New York City the following year, the latter work being under the direction of Professor Marshall H. Saville. The scene of these operations was a sandy bluff overlooking Raritan Bay in the village of Tottenville.

Many human skeletons were found, the most interesting being three adults, among

the bones of which were twenty-five arrow points. Twelve of these were made of deer antler and four of bone. Many of the bones of the skeletons were shattered and pierced; one rib in particular presents a cleanly cut hole which was made by a long tapering antler point.

At the time of this discovery only one antler arrow point had been recorded from this portion of New York state.

Certain Rare West Coast Baskets: H. NEWELL WARDLE.

This paper was read by title.

Stone Graves and Cremation Cists in the Vicinity of St. Louis: H. KINNER.

A résumé of explorations in the mounds and bottom lands in the vicinity of St. Louis with an endeavor to determine periods by the manner of inhumation.

Some Drawings from the Estufa of Jemez, New Mexico: A. B. REAGAN.

The drawings shown were made by the speaker during a two years' stay with this Pueblo tribe. The paintings from which the drawings were made were cosmic signs which may be noted in many of the estufas in the southwestern pueblos. The element of white contact was shown in the faces depicting the sun and moon.

This paper was discussed by George A. Dorsey, who dwelt upon the fact that it was no easy matter to persuade the conservative Indians of the Rio Grande region to divulge the meaning of their sacred symbols.

A Glossary of the Mohegan-Pequot Language: J. D. PRINCE and FRANK G. SPECK.

Read by title. Will be published in the *American Anthropologist.*

The newly elected officers for the Washington meeting are:

Vice-President—Walter Hough, U. S. National Museum, Washington, D. C.

Secretary—George H. Pepper, American Museum of Natural History, New York City.

GEORGE H. PEPPER,
Secretary.

CHARLES EMERSON BEECHER.

DR. CHARLES EMERSON BEECHER, professor of paleontology and curator of the geological collections in the Peabody Museum of Yale University, died very suddenly at his home in New Haven on the fourteenth of February, of an affection of the heart. Up to within an hour of his demise he had appeared in his usual health.

Dr. Beecher was the son of Moses and Emily (Emerson) Beecher, born at Dunkirk, New York, October 9, 1856. He was prepared for college at the high school of Warren, Pa., took the scientific course at the University of Michigan and was graduated as B.S. in 1878. His tastes had led him to a study of the native invertebrates, living and fossil, and after graduation he became an assistant to Professor James Hall, State Geologist of New York, and incidentally an expert collector and skilled preparator of fossils, in which the State Museum is so rich. Here he remained ten years, during which he perfected himself in the science of invertebrate paleontology, and then through the influence of Professor Marsh was placed in charge of the collection of invertebrate paleontology at Yale. Here he pursued his studies for the doctorate of philosophy, which he received from the university in 1889, his thesis being a memoir on a group of Silurian sponges. At the instance of Professor Marsh he spent the summer of that year collecting fossils in Wyoming. Subsequently he accompanied Dr. G. Baur on a visit to various European museums. He had had the advantage of a course in geology under Dana, and in 1891–2, during the illness of that veteran teacher, he conducted

the classes in geology. In 1892 he was made the assistant professor of historical geology in the Sheffield Scientific School, and in 1897 full professor and a member of the governing board. March 10, 1902, his title was changed to that of university professor of paleontology. In 1899 he succeeded the late Professor Marsh as curator of the geological collections and became a member of the board of trustees of the Peabody Museum. At the time of his death he was secretary to the board and a member of the executive committee. In 1899 he was elected a member of the National Academy of Sciences, a correspondent of the Geological Society of London and a fellow of the Geological Society of America. In 1900 he became president of the Connecticut Academy of Arts and Sciences and held this office until 1902.

Professor Beecher married, September 12, 1894, Miss Mary S. Galligan, who with two young daughters survives him. The interment was in Grove Street Cemetery, New Haven.

Like most successful students of organic life, Beecher was a born naturalist. As a boy he collected the shells of the region about Warren, Pa., where his home was situated, and his first scientific paper, published in conjunction with Mr. Walker, was a list of the land and fresh-water shells found about Ann Arbor, Michigan, the seat of the state university. The abundance of Devonian fossils about his home at Warren doubtless contributed to his early interest in them. In 1884 he published his first paleontological paper, an essay on the rare Paleozoic crustaceans known as phyllocarida, a subject to which he returned eighteen years later in a memoir which will be classical. Always a field naturalist, after his connection with the Sheffield Scientific School began his opportunities for work in the west became more frequent and fruitful. On becoming curator of the geological collections he presented to the university his private collection of fossils, the result of many years of accumulation and of great scientific value.

Beecher was one of those students who derived from the teachings of Hyatt and Cope those guiding principles in research which have proved so fruitful for American science. By the application of these principles, together with a thorough and minute knowledge of details, he produced those memoirs on the Trilobites, the Brachiopoda and the origin and significance of spines, upon which (with much other worthy work) his reputation in days to come will chiefly rest. Space fails for an analysis of these contributions, which are universally known among professional experts.

Beecher had the artist's gift and his papers were largely illustrated by himself, many of his drawings being of a high order of merit. He had the sense of order and proportion so necessary for a museum expert. He was quiet, cautious, without ostentation, efficient and enthusiastic.

The director of the scientific school has said of him:* "Quiet and unassuming, he never sought adulation, but when there was earnest work to be done, requiring skill, patience and good judgment, he would labor quietly and industriously, bringing to bear upon the problem such a measure of common sense and of thoughtfulness that confidence in and respect for his conclusions were inevitable. * * * No matter how trivial the duty, it was always done at the appointed time and thoroughly done. * * * As a friend he was loyal and trustworthy and his memory will always be cherished by his associates in the Sheffield Scientific School."

One of his pupils has testified to the inspiration given by him to his students, and how his patience, perseverance and inge-

* *Yale Alumni Weekly*, XIII., p. 488, March 2, 1904.

nuity served as an incentive to his associates, who were drawn closely to him by his enthusiasm and entire lack of egotism.

There is no doubt that in the death of Professor Beecher, not only has Yale sustained a serious loss and paleontology a severe blow, but the ranks of those capable of bringing to the study of fossils keen insight and a philosophical spirit of enquiry, guided by principles whose value can hardly be exaggerated, are diminished by one whom science could ill afford to lose, and to whom, humanly speaking, there should have remained many years of industrious and fruitful research. W. H. DALL.

SCIENTIFIC BOOKS.

THE MARK ANNIVERSARY VOLUME.*

VOLUMES in celebration of some noteworthy educational event are more common in Europe than with us, and naturally so. The advanced courses of instruction which alone can produce a body of trained disciples have had only about a quarter of a century's existence in America. As time goes on these memorials will doubtless increase in number; at present they can be counted on the fingers of one hand.

Few men have had more influence upon the highest class of zoological work in America than Professor Mark. Leaving his early mathematics and astronomy, he went to Germany, worked there with Leuckart and Haeckel and, on his return, at once entered the teaching force at Harvard. What he has accomplished during these years can only be realized by reading the list of the one hundred and forty former students who sign the appreciative dedication of this volume, and by examining the long list of papers turned out from the laboratory under his charge.

*'Mark Anniversary Volume To Edward Laurens Mark, Hersey Professor of Anatomy and Director of the Zoological Laboratories at Harvard University, in celebration of twenty-five years of successful work for the advancement of zoology, from his former students, 1877–1902.' New York, Henry Holt and Company. 1903. Pp. xiv + 513; 36 plates.

It is impossible for one man to write a critical review of the twenty-five papers which are contained in this splendid quarto volume. Even a bare summary of the articles will take more space than this journal can spare. All that can be done is to enumerate the papers, with such hints of their contents as will convey some idea of their scope. A fine photogravure of Professor Mark forms the frontispiece; then follows the dedication, to which allusion has been made, and next the papers which make up the volume. These have a wide range of subjects, but one thing which is striking is the small number of strictly embryological articles such as formed the bulk of the work from his laboratory during the first half of his labors at Harvard.

Two of the papers deal with habits. H. R. Linville deals with a couple of tube-building annelids, describing among other things the manner in which they build their tubes; while Jacob Reighard gives a long, detailed and interesting account of the habits of *Amia*, especially during the breeding season and the care of the young.

Four of the papers describe new species. C. A. Kofoid describes a new protozoan, *Protophrya ovicola* allied to *Opalina*, found in the food sac of *Littorina rudis*. S. Goto gives an account of two new medusæ, *Olindoides formosa* and *Gonionema depressum*, from Japan, pointing out that these genera with *Olindias*, *Halicalyx* and *Gonionemoides* form a natural family Olindidæ, and that the problematical fresh-water genera *Limnocodium* and *Limnocnida* belong near them. Four new species of trematodes, three of them from the air passages of snakes and one from the frog, form the subject of the paper by H. S. Pratt, while H. P. Johnson describes three species of polychæte annelids from the fresh waters of the world, enumerating in his article twenty-four species of the group known to occur in fresh water.

The morphological articles are more numerous. J. H. Gerould discusses the development of *Sipunculus* and *Phascalosoma* from the beginning of gastrulation to the escape of the larva, pointing out that the 'serosa' of *Sipunculus* is a modification of the prototroch

of *Phascalosoma*. Ida Hyde has examined the eyes of *Pecten* with the aid of modern neurological methods, and concludes that our previous interpretation of the function of some parts must be erroneous. H. B. Ward gives a detailed account of several larvæ of the bot fly, *Dermatobia hominis*, which occur as parasites in man and other warm-blooded animals in the tropics.

Two papers deal with the Tunicata. William E. Ritter has a new tunicate, *Herdmannia claviformis*, from California, the anatomy of which is detailed and some facts concerning its development are given. It apparently belongs near *Amaroucium*, but must form a new family. F. W. Bancroft found a colony of *Botryllus* at Naples which partly died down and then exhibited rejuvenescence. The physiology and the structural changes involved are described, the author concluding that deficient nutrition was the cause of the phenomena observed.

H. V. Neal and W. A. Locy both deal with the nerves of sharks. Neal describes the method of the formation of the ventral roots of the spinal nerves, analyzing the fates of various cellular elements which have been described in the cord, and concluding that all the neuraxones are formed from medullary cells and that the cells of the ventral nerves are concerned alone in the formation of the neurilemma and possibly some of the connective tissue. Locy returns to his 'new nerve,' which parallels more or less closely the olfactory nerve. He has now found it in nineteen genera of elasmobranchs, but finds no traces of it in the teleosts and amphibians which he has studied. P. C. Sargent takes for his contribution an account of that peculiar structure, the torus longitudinalis of the teleost brain, which he shows is nervous in character and serves as a center for the receipt of those impulses from the optic nerves which call for quick reflexes. C. H. Eigenmann has been fortunate enough to obtain eggs of the blind fish, and he has given here an account of the development and degeneration of the eye.

R. M. Strong shows that the metallic colors of the feathers on the neck of the domestic pigeon can not be explained as produced by diffraction spectra or by refraction prisms, but that they must arise as thin plate interference colors produced between the contained spherical pigment granules and the outer transparent layer of the feathers.

Thomas G. Lee presents a paper on the fixation of the ovum in the striped gopher, *Spermophilus tridecemlineatus*, the first of a series on the development of this form. The details are not readily presented in abstract, but it is shown that this form differs from all other mammals in the temporary fixation mass.

The only paleontological paper is by C. R. Eastman upon the peculiar selachian fossils, *Edestus* and its allies, which are known chiefly by a peculiar series of structures, often interpreted as spines, but now shown to be a coiled series of symphysial teeth, the structures reaching their extreme in *Helecoprion*.

The subject of variation is treated in two papers by Dr. and Mrs. C. B. Davenport. Dr. Davenport compares the variability of the scallops from Florida and from southern California, showing that the latter are much more variable and correlating this with the more varied environment and the greater geological changes on the Pacific coast. Mrs. Davenport has studied the number of stripes in the sea anemone, *Sagartia leucolena*, and concludes that their number is in part due to longitudinal fission. She also confirms the observations of Torrey and Parker which show that the monoglyphic conditions so frequently found in normally diglyphic hexactinians are to be explained by the same type of asexual reproduction.

The two physiological papers, by G. H. Parker on the phototropism of *Vanessa antiopa* and by R. M. Yerkes on the reactions of *Daphnia* to light and heat, hardly admit of summary. Parker shows that *Vanessa* creeps and flies towards the light, but comes to rest with its head away from strong light. When the eyes are blackened all phototropism ceases. It is not affected so much by strength of light as by the size of the light area, and its retreat at night is largely dependent upon temperature changes. In *Daphnia*, according to Yerkes, phototropism occurs with light of all

intensities and heat seems to have no effect, except in the absence of light, when they migrate to the colder area. Experiments also show that heat does not act in the same way as light upon the organism.

H. S. Jennings points out that in infusoria and in certain rotifers, besides the radial and bilateral types there is a third type, the spiral or at least one-sided, asymmetrical type of structure with a definite relation to the method of movement and life. In the rotifers this asymmetry affects the internal organs as well as the external features which cause the spiral swimming.

The only cytological paper is by R. Floyd, who describes the nerve cells of the cockroach under various kinds of preservation. He concludes that all nervous studies must be controlled by study of the living tissue. The thoracic ganglion cells have no evident cell walls. The cytoreticulum is studied, but no classification of the cells found was possible.

Last to be mentioned is the paper by W. E. Castle and G. M. Allen on the heredity of albinism and Mendel's law. They have experimented with mice, guinea-pigs and rabbits, and find that complete albinism is always recessive. A suggestion is made to account for the phenomena of mosaics, and it is pointed out that cross-breeding frequently brings out latent characters and that this probably affords the explanation of many cases of reversion.

In closing this synopsis of the volume the reviewer may be allowed to praise the mechanical execution of the work. The plates—produced by lithography, heliotype and other photo processes—*illustrate* the papers. The proof-reading has been done in a careful manner, and probably the work owes not a little of its many excellencies to its editor, Dr. G. H. Parker.

J. S. KINGSLEY.

SCIENTIFIC JOURNALS AND ARTICLES.

The Bulletin of the American Mathematical Society for February contains the following papers: Report of the Tenth Annual Meeting of the American Mathematical Society, by F. N. Cole; Report of the Cassel meeting of the Deutsche Mathematiker-Vereinigung, by R. E. Wilson; 'On a Test for Non-uniform Convergence,' by W. H. Young; 'On the Condition that a Point Transformation of the Plane be a Projective Transformation,' by Elijah Swift; 'Note on Cauchy's Integral,' by O. D. Kellogg; Review of Bauer's Algebra, by L. E. Dickson; Shorter Notices of Wölffing's Mathematischer Bücherschatz, Bucherer's Vektor-Analysis, and Ferraris's Grundlagen der Elektrotechnik; Notes; New Publications.

The March number of the *Bulletin* contains: Report of the December Meeting of the San Francisco Section, by G. A. Miller; Report of the Fifty-third Annual Meeting of the American Association for the Advancement of Science, by L. G. Weld; 'On a Gap in the Ordinary Presentation of Weierstrass's Theory of Functions,' by W. F. Osgood; 'On the Theorem of Analysis Situs Relating to the Division of the Plane or of Space by a Closed Curve or Surface,' by L. D. Ames; Review of Hadamard's Propagation des Ondes, by E. B. Wilson; Review of Burkhardt's Theory of Functions, by L. E. Dickson; Notes; New Publications.

SOCIETIES AND ACADEMIES.

THE ANTHROPOLOGICAL SOCIETY OF WASHINGTON.

THE 355th meeting was held on February 9. A letter from Miss Fletcher was read in which she stated that, owing to sickness, she would not be able to deliver the presidential address. A letter from Dr. Daniel Folkmar describing the anthropological work he is carrying on in the Philippines was read by the secretary.

Dr. Ales Hrdlicka exhibited cremated human bones from the Choptank River, Md., collected by Dr. Elmer Reynolds, and stated that they are interesting as the first evidence of cremation in the eastern United States except in Florida. Dr. Reynolds, who was present, described the conditions under which the remains were found.

The first paper of the evening, by Mr. W. E. Safford, discussed the question, 'Were the Aborigines of Guam Ignorant of the Use of Fire?' Mr. Safford showed in the clearest manner the origin of the myth that the Chamorros of Guam were fireless at the dis-

covery of the island, finally running it back to the story of a sailor who had accompanied Magellan. At present the inhabitants of Guam make fire by the plow and saw methods, the latter introduced from the Philippines.

The title of Professor L. F. Ward's paper was 'Monogenism or Polygenism.' Professor Ward added much from the biological side that is new and germane to the topic of man's descent, which long agitated anthropologists until the weight of opinion fell to the balance of monogenism. There is no such thing in nature as a first pair; nature is a becoming; there is no abrupt beginning; monogenism, therefore, is the theory that the human races have all descended by various lines from a common ancestry. Biologists are practically at one as to the descent of all living creatures from one primary source. Polygenism is regarded by them as impossible either for the human race or for animals or plants.

The difficulty is to make this clear to non-biologists, and Professor Ward began by explaining that function is simple, while structure is immensely varied. Functions are the ends to which structures are the means.

For example, there is only one kind of life, and only one kind of mind or reason. There are comparatively few vital functions and the same function may be performed by entirely different structures. This is illustrated by what are called analogies in biology. Flight, for example, is a function, but the wings of insects, birds and bats are all different structures. While functions are always the same, there is complete fortuity in structures, and the same structure would never be independently developed twice. Man is a bundle of structures, and the chances are infinity to one that another being could have independently arisen exactly like him. Following out this idea, Professor Ward said that the inhabitants of Mars, should there be such, could not be like any of our types of animals. Fertility *inter se*, which obtains in all the human races, was also urged as an argument against the possibility of polygenism, and as showing that the lines of descent of the human races are very short.

One of the most important corollaries from the monophyletic origin of man is that all races are of the same age; *i. e.*, all are equally old. There are no 'primitive' races. Man is characterized only by degrees of culture and advancement, but all have taken the same time to reach the point of development in which they are now found.

The paper was discussed by Dr. O. F. Cook, who objected to the use of both monogenism and polygenism and suggested eurygenism as denoting the tendency of all life to ramify.

The 356th meeting was held February 23. The report of the committee on the preservation of American antiquities was heard and the bill which they have prepared read to the society. The matter was referred to the next meeting for discussion.

Dr. Ales Hrdlicka exhibited and described a true fossil human skeleton from the western coast of Florida. Very few such remains have been found in which the organic matter of the bones has been replaced by mineral. The specimens shown are in the National Museum, one of them a skull converted into limonite, the other a fragmentary skeleton, mineralized in somewhat different manner. The former was described by Professor Leidy in 1879. The bones have been analyzed and are found to contain only eight tenths per cent. of organic matter, but the physical characteristics of the skeleton are Indian-like, and do not point to any great antiquity.

Dr. I. M. Casanowicz read a paper entitled, 'Sacrifice as a Means of Atonement and Communion with the Deity.' The origin of sacrifice was assumed to be a homage actuated by fear and the offerings were naturally of food, and the act was a providing for the wants of the god. In ancient belief the spirits of the gods gathered like flies around the sacrifice. It came to be thought that the gods smelt the sweet savor of the sacrifice and that men depended on the gifts of the gods, and conversely the gods depended on the offerings of men. Later the dependence of the gods on men was eliminated and we have sacrifices of another kind, as the human sacrifice, which may emanate from the belief that the value of the gift is proportioned to the privation of the

giver, and the sacrifice of the first born arises and the self-infliction of pain.

The blood relationships between men and gods arising from the organization of men in kindreds with heads, representatives of gods, was discussed by Dr. Casanowicz and interesting examples of the beliefs and rites given.

Dr. B. Rosalie Slaughter, who has recently returned from the east, gave an illustrated paper, entitled, 'A Journey in Korea and North China.' Attractive views were shown of the scenery, villages, architecture and people, with comments on them that showed the thorough acquaintance of Dr. Slaughter with the subject. At the close of the paper the society passed a vote of thanks to Dr. Slaughter for her interesting address.

WALTER HOUGH,
General Secretary.

THE SOCIETY FOR EXPERIMENTAL BIOLOGY AND MEDICINE.

THE fifth regular meeting of the Society for Experimental Biology and Medicine was held on the evening of February 17, in the rooms of the department of pathology of the Cornell University Medical College. Dr. S. J. Meltzer presided. *Members present:* Adler, Calkins, Crampton, Dunham, Ewing, Gies, Jackson, Levene, Lusk, Meltzer, Murlin, Norris, Richards, Wadsworth, Wallace, Wilson, Woodworth, Yatsu. Abstracts* of the reports of original researches follow:

The Nature and Basis of Sexual Selection in Moths: H. E. CRAMPTON.

The object of the investigation described was to obtain a quantitative expression for the strength of the mating instinct in certain species of large saturnid moths (*Philosamia cynthia* and *Samia cecropia*), and to determine the correlation between the mating instinct and structural characters. The results of earlier statistical studies upon the pupæ of these species were reviewed, dealing with the nature and basis of the process of natural selection during the period before emergence and at emergence. It was shown that:

1. Those pupæ which die after pupation and prior to metamorphosis are structurally different from and more variable than those individuals which successfully survive the pupal period.

2. Those pupæ which become perfect moths are likewise different from those which can not emerge as perfect moths.

3. The basis for selective elimination is to be sought in correlation between the various structures.

The mating period follows immediately after metamorphosis, when certain individuals with weak mating instinct fail to take part in the production of the next generation, and are thus 'sexually eliminated.' In order to determine the points mentioned above, pupæ of the two species named were isolated as the time for metamorphosis approached, and upon emergence were given one opportunity to mate. It was, therefore, possible to compare the pupæ of the two classes of mating and non-mating individuals. The results, briefly stated, are:

1. That even slightly imperfect moths possess very little mating instinct, or in other words, that with the structural conditions associated with an imperfect power of emergence is correlated a low grade of mating ability.

2. That the mating individuals of the perfect class differ structurally to a certain extent from the non-mating ones, but they are very much less variable than the latter class.

The importance of these results from the standpoint of inheritance and evolution is sufficiently clear to render extended discussion unnecessary.

Observations on a Serous Fluid of Unusually High Molecular Concentration: E. K. DUNHAM.

The fluid was removed from the pleural cavity of a man suffering from lobar pneumonia. The patient was a scene-shifter in a theater and had suffered considerable pain in the chest for four months before his admission to the hospital. His occupation required severe labor for brief periods, during

* The authors of the reports have furnished the abstracts. The secretary has made only a few abbreviations and minor alterations in them.

which he became much heated, with intervals of leisure and exposure to cold drafts of air. The immediate reasons for his admission were a chill and inability to continue work. There was nothing unusual in the clinical course of the pneumonia or peculiar in his treatment. A few days after he entered the hospital 400 c.c. of a clear serous fluid was aspirated from the affected side of the chest and was examined on the same day, with the following results:

Distinctly alkaline, specific gravity, 1021; depression of freezing point, 1.383° C. (mean of three examinations with different portions of the fluid, 1.395, 1.385 and 1.370° C. respectively); electrical conductivity, 0.009119; chlorine calculated as NaCl, 0.58 per cent.; total nitrogen, 0.84 per cent.; nitrogen from washed tannic acid precipitate expressed in percentage of the fluid, 0.83 per cent.; proteid (N $\times$ 6.25), 5.21 per cent. of the fluid; traces of reducing substance (sugar?) after removing proteids with ferric acetate; traces of nitrogen liberated by hypobromite of soda; no extractives of appreciable amount upon shaking with ether, acetic ether, or chloroform.

The matter of chief interest in the results was the considerable depression of the freezing point—0.81° C. greater than that by the blood, which was found to be 0.57° C. This 0.81° C. represents nearly 0.438 gram-molecule in solution in excess of the molecular concentration of the blood, and appears to be a clear indication that osmotic interchanges between this fluid and the blood did not freely take place, possibly because of a thick layer of fibrin upon the pleural surfaces. Such a deposit would not, however, explain the high molecular concentration of the fluid. It appears most probable that this was produced subsequent to the formation of the fluid, by cleavages in the larger molecules originally present in solution or by the solution of substances not at first dissolved. These substances could not be dissociable, because the electrical conductivity was rather lower than is usual in such fluids. If the substances causing the high molecular concentration were organic compounds they were not extractives soluble in ether, acetic ether or chloroform.

On the assumption that cleavage products of proteid substances, precipitable with tannic acid, might be present and cause the unusual depression of the freezing point, the following experiments were made: Sterile horse serum, which had not been subjected to heat, was divided into portions. Of these some were kept for controls and others were inoculated with pure cultures of *Staphylococcus pyogenes aureus*, or Fraenkel's pneumococcus. Freezing-point determinations were made on certain of these portions and the rest were sealed up in pipettes holding 100 c.c. each. These were incubated at 37° C. for a week, when freezing-point determinations were made on one of the controls and one of the tubes inoculated with each of the bacteria mentioned. Cultures at this time showed the presence of great numbers of the species used, with no admixture of other species. The remaining tubes were left in the incubator for several months, when cultures proved to be sterile. The results of physico-chemical examination of these sera are tabulated below:

HORSE SERUM A.

Sterile Controls.

1903	°C.
May 19—	$\Delta = 0.580$; $K = 0.009394$
May 26—	$\Delta = 0.580$; $K = 0.009491$
1904	
Jan. 16—	$\Delta = 0.590$; $K = 0.009684$

Inoculated with Staphylococcus.

1903	°C.
May 19—	$\Delta = 0.585$; $K = 0.009370$
May 26—	$\Delta = 0.585$; $K = 0.009674$
1904	
Jan. 16—	$\Delta = 0.640$; $K = 0.010128$

HORSE SERUM B.

Sterile Controls.

1903	°C.
May 21—	$\Delta = 0.560$; $K = 0.009516$
May 28—	$\Delta = 0.560$; $K = 0.009516$
1904	
Jan. 15—	$\Delta = 0.600$; $K = 0.009897$

Inoculated with Staphylococcus.

1903	°C.
May 28—	$\Delta = 0.580$
1904	
Jan. 15—	$\Delta = 0.640$; $K = 0.010372$

These data show but slight changes in the molecular concentration of the sera, and such changes as have occurred occasion an increase in the electrical conductivity as well as in the depression of the freezing-point, showing that dissociable bodies have been produced. The experiments, therefore, fail to explain the high molecular concentration of the serous fluid from the chest; but it is possible that further experimentation in this direction will be more successful.

An Experimental Study of the Eosinophile Cells during Infection with an Animal Parasite—Trichina spiralis: EUGENE L. OPIE. (Presented by James Ewing.)

The administration of *Trichina spiralis* to the guinea-pig causes an increase of the eosinophile leucocytes in the blood, comparable to that which accompanies human infection. There is no constant alteration of the number of these cells until the end of the second week after infection, when their relative and absolute number rapidly increases and reaches a maximum at the end of the third week. At this time embryonic trichinæ are in process of transmission from the intestinal mucosa by way of the lymphatic vessels and the blood through the lungs to the vascular system.

Eosinophile cells accumulate in the mesenteric lymph glands and in the lungs, and form foci which resemble small abscesses in which polynuclear leucocytes are replaced by eosinophile cells. These cells are provided with polymorphous nuclei and do not differ from the eosinophile leucocytes of the circulating blood. Accumulation of the eosinophile cells in the mesenteric lymph glands and in the lungs is explained by the transmission of the embryonic parasites through these organs.

Increase of eosinophile cells in the blood and in other organs is accompanied by characteristic changes in the bone marrow. The fat is diminished in amount and cellular elements replace it. Cells with eosinophile granulation are present in immense number and particularly numerous are the eosinophile myelocytes, cells peculiar to the bone marrow. Eosinophile cells undergoing mitotic division are more numerous than usual.

The number of eosinophile leucocytes in the blood always diminishes before death, so that the proportion is usually less than one per cent. Infection with a very large number of trichinæ causes a rapid diminution of the number of eosinophile leucocytes and is quickly fatal. The eosinophile cells of the bone marrow exhibit degenerative changes of which nuclear fragmentation is most characteristic. Similar changes may affect the eosinophile cells of the intestinal mucosa and of the mesenteric lymph glands. Mild infection stimulates the eosinophile cells to multiplication, but severe infection causes their destruction.

Subcortical Expressive Reflexes and their Spinal Pathways: R. S. WOODWORTH.

Dr. Woodworth reported on some experiments done in collaboration with Professor Sherrington in the latter's laboratory. It was shown that in a recently decerebrated cat powerful sensory stimuli evoked reactions such as in a normal animal would be expressive of pain, anger and other similar emotions. Such reactions are, therefore, primarily subcortical reflexes and not dependent on the organ of consciousness. The 'ether cry' also appeared in decerebrate animals. The sensory spinal pathway, by which these signs of pain were aroused, was found by experiments in which partial cross-sections of the cord were made, to run, not in the posterior, but in the lateral columns. The pain pathway from either side of the body runs up both halves of the cord, but more largely up the opposite half.

An Experimental Study of the Cause of Shock: W. H. HOWELL. (Presented by S. J. Meltzer.)

Professor Howell's experiments were made upon dogs anæsthetized with morphia and ether, and brought into a condition of shock by operations of various kinds. Blood-pressure records were obtained in the usual way during the experiment. The following general conclusions were reached:

1. The most important and dangerous feature of severe shock is a long-continued, practically permanent fall in blood pressure to about 20–40 mm. of Hg. This condition is

designated as vascular shock and is due to a long-lasting loss of activity of the vaso-constrictor center.

2. A second important result of shock is a very rapid and feeble heart beat. This condition is designated as cardiac shock; since, although it may result secondarily from the permanent fall in blood pressure, it may also occur quite independently of the vascular shock as a primary result of the operations. Cardiac shock, so far at least as the rate of beat is concerned, is due to a more or less permanent loss of activity of the cardio-inhibitory center.

3. Intravenous infusions of alkaline salt solutions (NaCl, 0.6 per cent.—Na_2CO_3, 0.5 per cent.) cause a rise of pressure by increasing the force of the heart beat. The effect is more durable than with salt solution alone and may be renewed by repeating the injection.

4. The fundamental cause of vascular and cardiac shock is not exhaustion of the vasomotor and cardio-inhibitory centers from overactivity, but a more or less permanent inhibition of these centers from excessive stimulation of the inhibitory paths.

New Members.—Drs. Isaac Levin and J. P. Atkinson were elected to membership.

Officers for the ensuing term were elected as follows:

President—S. J. Meltzer.
Vice-President—James Ewing.
Secretary—William J. Gies.
Librarian—Graham Lusk.
Treasurer—Gary N. Calkins.

William J. Gies,
Secretary.

THE AMERICAN MATHEMATICAL SOCIETY.

A regular meeting of the American Mathematical Society was held at Columbia University on Saturday, February 27. The American Physical Society met at the same time and place, and an especially interesting feature of the occasion was the presidential address of President A. G. Webster of the Physical Society on 'Some practical aspects of the relations between physics and mathematics,' which was delivered before a joint session of the two societies.

The attendance at the meeting of the Mathematical Society was about forty-five. President Thomas S. Fiske occupied the chair at the regular sessions and at the joint session with the Physical Society. The following new members were elected: Mr. E. P. R. Duval, Harvard University; Professor G. A. Goodenough, University of Illinois; Mr. H. C. Harvey, State Normal School, Kirksville, Mo.; Dr. J. G. Hun, Princeton University; Dr. T. P. Running, University of Michigan. Nine applications for membership in the society were received.

Professor E. H. Moore, who had served as editor-in-chief of the *Transactions* since its inception in 1900, was reelected to the editorial board for a term of three years.

The following papers were presented at this meeting:

William Findlay: 'The Sylow subgroups of the symmetric group.'

L. P. Eisenhart: 'Three particular systems of lines on a surface.'

Joseph Bowden: 'The definition of sine and cosine.'

H. E. Hawkes: 'The quaternion number systems.'

L. E. Dickson: 'On the subgroups of order a power of p in the linear homogeneous and fractional groups in the $GF[p^n]$.'

C. M. Mason: 'On the solutions of $\Delta u + \lambda A(x, y)u = f(x, y)$ which satisfy prescribed boundary conditions.'

F. N. Cole: 'The groups of order $p^\alpha q^\beta$.'

Edward Kasner: 'Galileo and the concept of infinity.'

E. W. Brown: 'On the smaller perturbations of the lunar elements.'

E. B. Van Vleck: 'On the convergence of algebraic continued fractions whose coefficients have a limiting form.'

Henry Taber: 'Hypercomplex number systems.'

Edward Kasner: 'On the geometry of ordinary differential equations.'

Ida M. Schottenfels: 'On a theory of functions related to a hypercomplex number system in two units.'

G. D. Birkhoff: 'A general remainder theorem.'

The members of the two societies lunched together in the interval between the sessions,

and a representative number were present at an informal dinner arranged for the evening.

The next meeting of the Mathematical Society will be held at Columbia University on April 30. The Chicago Section will meet at Northwestern University, Evanston, Ill., on April 2. The San Francisco Section will meet at Stanford University on April 30.

F. N. COLE,
Secretary.

DISCUSSION AND CORRESPONDENCE.

CONVOCATION WEEK.

THE present multiplicity of scientific societies appears to have its origin in four conditions: (1) in adaptation to the present differentiating or specializing tendency in science; (2) in adaptation to the magnificent distances in this country; (3) in historical peculiarities of origin, notably the former existence of both summer and winter meetings, and (4) in sundry failings of human nature. In so far as this multiplicity is due to the first condition, it is inevitable, if not actually desirable; in so far as it is due to the second, it is necessary; in so far as it is due to the third, it is susceptible to an appeal to reason and public spirit; while as to the fourth, it must be allowed for in any plans for improvement of existing conditions. The other extreme from the present multiplicity, viz., consolidation into a single great many-sectioned society, seems to me, for the above reasons, not only impracticable, but highly undesirable. There is no real analogy between the conditions of scientific progress, which depends much upon individualism and little on organization, and the conditions of a great business where organization is in itself of prime importance; and it is a mistake to suppose that the benefits of consolidation would be as great in the one case as in the other. The real task before us, I believe, is to seek and to achieve that optimum in number and kinds of societies which lies somewhere between the present uneconomical maximum and the unattainable and undesirable minimum of a single society.

Some of the essential conditions of this optimum seem to me these. It must provide for yearly meetings in each of the great natural divisions of the country, the eastern, central, (and ultimately) western and Pacific sections; for, so great are the distances, and so high the cost in money, time and effort required to cover them at the midwinter season, that a far greater aggregate attendance on scientific meetings, with the resultant benefits, will be secured by this system than can possibly be attained by any single meeting, however central. Furthermore, it is a mistake to suppose that the biggest meetings are, other things being equal, necessarily the best; there is much to be said for the greater profit, as well as pleasure, of smaller meetings. While, of course, a single great society could meet in geographical divisions, it is certainly wiser to utilize for this purpose the existent arrangements, namely, local meetings organized under the auspices of the American Society of Naturalists. There are other reasons, also, why a second group of societies in addition to the American Association is desirable: (1) A vigorous but friendly rivalry will be distinctly advantageous, and much preferable to a society monopoly, and (2) since the American Association is unlimited as to qualifications of membership, and must always have and care for a large semi-scientific or popular element in its activity, there is certainly a need for other societies which will be strictly scientific in their membership and able to conduct their affairs upon a purely scientific basis. I think, therefore, it is very desirable that both the American Association and the American Society of Naturalists should exist, the former meeting in different sections of the country in different years, and devoting itself to the more general aspects of the sciences, and the latter forming a center for the meetings of the more technical scientific societies, and holding a meeting each year in each of the great geographical divisions of the country. The relations between the two should be friendly and cooperative, and that division of the American Society within whose territory the American Association happens to meet should always combine with it in joint meetings, the other divisions meeting in their own territory. It might be advantageous at certain intervals, of not less

than five years for all the divisions and societies to hold one meeting in common.

This does not, however, touch one of the most serious phases of the present situation, namely, the existence of many independent societies within the same science, a condition especially pronounced in botany. Not only does this entail a great waste of effort, but it deprives the science of the advantage and prestige of a powerful national body which can speak and act with authority in the interests of the science. At the same time each science is becoming so specialized that it is more agreeable and profitable for those interested in the same phase of it to meet by themselves. It is customary to deprecate this tendency, on the ground that specialists should keep more in touch with other phases of their science as well as with other sciences. But in practise I think this segregation is inevitable, and not undesirable or, at all events, it represents the lesser in a choice of evils. A specialist in one branch of a science can not keep in touch with another branch by suffering through technical papers read on that latter phase; he can accomplish this result much better around the social table in the evenings, and by listening to, or reading, those admirable summaries of progress in other branches which it is becoming more and more the custom to present in vice-presidential addresses, in semi-popular lectures by great specialists, etc. The best solution of this particular problem seems to me to lie in the combination of all the societies devoted to a certain science into a single strong national society, which shall be divided into as many sections as there are special phases, attracting enough men to form working sections, and which shall hold simultaneous meetings in the great geographical centers, along with the other scientific bodies affiliated with the American Society of Naturalists. This can undoubtedly be accomplished without the abandonment of any of the existent societies, through their transformation into the special sections of the national society.

W. F. Ganong.

I beg leave to submit the following plan for increasing the usefulness and influence of the American Association for the Advancement of Science:

Organization.—In addition to the present organization, establish a branch in each community where there are a number of members of the association.

Meetings.—In addition to the general meeting, have each section meet once a year and each branch once a month, or oftener if it should appear to be profitable.

Publications.—Publish Science as at present, and in addition publish all the papers presented at the section meetings and the more important of those presented at the branch meetings (in the *Transactions*); issuing a set of the *Transactions* for each section.

In nearly every community there is a demand for some organization of those interested in science; so we see science clubs in nearly every university. These clubs form social centers for the scientists of the communities, and their meetings offer an opportunity for their members to report on and discuss the work which they are doing. In most cases they would be willing to reorganize as branches of the American Association for the Advancement of Science if given considerable freedom in the character of organization. The parent society could charter a branch on receiving a copy of its constitution, which should make provision for a report of each meeting, being sent to the general secretary. Each will then have the advantage of cooperation while still having freedom of government.

The best time for holding the general meeting, at which the social element should be emphasized, appears to be in the early summer. Each section would hold its meeting in connection with the general meeting as at present; but in addition would hold a meeting during convocation week, the summer meeting being given to the more general papers and excursions, while the more technical papers would be presented at the winter meeting. These winter section meetings need not be held all at the same place, and if desirable any section might hold two simultaneous meetings at different places.

Science is serving a very useful purpose now in publishing the vice-presidential ad-

dresses and the abstracts of all the papers, as well as serving as a clearing house for scientific thought. The objection may be raised that publishing all the papers would make the *Transactions* too expensive. The answer to this is that the present fee should cover the general expenses and SCIENCE only, while the *Transactions* should be sold by subscription; each member subscribing for the *Transactions* of those sections in which he may be interested.

This plan would provide more time for the presentation of papers; provide meetings at which matters of somewhat local interest could be discussed; allow the sections a choice as to the place of meeting, and provide a place where all papers could be found instead of having them scattered through many periodicals. The economy of this plan as to both time and money would probably check the formation of new societies and also lead to the abandonment of many now organized; which are ends much to be desired.

ARTHUR H. FORD.

OUR FUTURE 'PUBLIC ANALYSTS.'

THE era of *scientific* investigation and protection of our food products and standard drugs, in distinction to the medico-political attempts of the past twenty years, is apparently at hand, and, as time will undoubtedly demonstrate, in proper hands. To be sure a certain few boards of health and food commissioners have at various times accomplished much in partial food inspection and one or two, notably the Massachusetts Board of Health, through its efficient secretary, Dr. Abbott, have rigidly inspected both foods and drugs for many years, bringing the universal fifty per cent. adulteration of those foods, etc., that can be adulterated, as shown by investigation statistics in other states, down to about fifteen per cent. and keeping it there. In these few widely separated states the legislatures will no doubt 'let well enough alone,' and, if appreciative at all of what has been accomplished, will increase the appropriation, which in nearly every case is absurdly small at present. In the forty odd states as yet unawakened or only partially awakened to a realization of our national negligence in this great economic question, it is gradually becoming apparent that the state experiment stations are, or soon will be, the logical and most appropriate institutions to entrust the collection, investigation and subsequent defined inspection work to; the 'food commissioner' (if that be what he is called) being merely a prosecuting officer, which in general is the arrangement (and doubtless a satisfactory one) in Connecticut at present.

There are several gradually developing and well-founded reasons why we must begin to consider these well-organized, federal and state supported, scientifically equipped branches (in their chemical work) of the Bureau of Chemistry at Washington in this light. In the first place, there is very little adulteration of food products harmful from a hygienic standpoint. Physicians of course must be able to depend upon the strength of the drugs they prescribe, but otherwise the whole subject is really an economic one, closely related to agriculture, horticulture and animal industry, the three most important lines of experiment station work. Secondly, the Bureau of Chemistry, under Dr. Wiley's direction, already has charge of the examination of imported food products and, as soon as the long-delayed federal food law becomes effective, will have charge of the interstate commerce aspect of the question, thereby greatly assisting the states in their necessary local work. In several states, notably Connecticut, Pennsylvania and Kentucky, the experiment stations already carry on the state investigation and food inspection analysis work. Thirdly, these stations are financially and scientifically able to carry on research work upon the composition, nutritive value, utility, etc., of new or little-understood foods, simultaneously with official inspection work; and finally the chemists of these stations in their official association, commonly spoken of as the A. O. A. C., have recently studied, compiled and published provisional official methods of food analysis (at present, however, better adapted to investigation work rather than to rapid inspection and legal work), and defined the standards that legally pure food products should conform to.

In their annual convention in Washington, in November, a most important place in the program has been given to the whole subject, and soon afterwards many of the stations will undoubtedly establish special laboratories for investigation and possible inspection work, carrying out a suggestion made by the Office of Experiment Stations in Washington, a number of years ago (Bulletin No. 17).

So much for the experiment station and the probable part it will play in the solving of an economic question wherein we are a half century behind European nations. The natural and very important question next arising is relative to our future 'public analysts,' that comparatively large body of specially trained chemists, presumably young, considering the meager salaries usually allowed for routine laboratory work, who will be required in every state, and often at a moment's notice, by the experiment stations and by every state, county or municipal board of health or officer charged with the enforcement of locally protective legislation. These men will not only have to be already familiar with the modern methods of food and drug investigation and rapid legal inspection analysis, especially microscopical methods, which are frequently the only ones showing the nature and approximate proportion of the adulterant as the courts always require; but they will find that, upon the expert witness stand, a quite thorough knowledge of the natural composition, nutritive and economic value, utility, methods of adulteration and character of usual adulterants of foods is indispensable. The first contested prosecution, a grocer, backed by a large manufacturing concern and furnished with the best of legal aid and an experienced chemist looking for flaws and coaching said legal aid, was the experience demonstrating to the writer the above requirements; and one hundred and fifteen other mostly successful and often contested cases since, only serve to emphasize the fact in his mind.

In the British Isles the 'public analysts' constitute the best trained, most progressive and finely organized class of practical chemists to be found, their official association, the Society of Public Analysts, being always consulted by the government on any subject involving analytical chemistry, and their journal, *The Analyst*, being the leading and almost the only publication devoted to analytical chemistry in the English language. These chemists are trained in special schools or special university courses and, after passing an examination, including the whole subject of foods and drugs and their chemical and microscopical examination, are admitted to membership in the Institute of Chemistry and become eligible to appointment by counties or municipalities inspecting or intending to inspect the local food, drug and water supplies. Now let us turn to the status of affairs in our own country. It is said, and it will be generally admitted as true, that if, in the season of legislative activity, a half dozen of the as yet unawakened states were to pass laws protecting and governing the sale of foods and drugs, it would be impossible to find the necessary number of specially trained analysts ready and competent to undertake the work at hand. Of course, plenty of chemists with the ordinary college training in analytical chemistry or some other special training would be found and appointed, but so long a period of confidence acquiring study and practise would be necessary before any prosecutions were advisable, that the temporarily enthused legislature and public would forget about and lose all interest in the work and decide that it had been found to be unnecessary or impolitic—a condition of affairs that the grocery and druggist organizations would not be slow to take advantage of, as has been shown more than once in the not remote past.

Yale University has recently outlined courses in several of the afore-mentioned necessary subjects, and has engaged Winton, state chemist at the Connecticut Experiment Station, to give the necessary instruction in lectures and laboratory work. A few other large universities are planning to, and doubtless will, introduce similar and perhaps more complete courses in the near future. With the exception of Yale and possibly Harvard, however, they will not have the distinct advantage of having the students brought in

direct contact with official work and official chemists. In the forty-eight state colleges or universities, partially supported by the federal government through the land grant and Morrill acts, we have, however, practically the same number of very conveniently situated and well-equipped institutions for training, at least the locally needed, public analysts of the future. That their location is especially fortunate for this purpose is due to the fact that nearly all the experiment stations are located in the same towns and in fact are often really departments of the university or college, with a staff made up principally of members of the college faculty. Some of these public educational system extensions, Cornell University and the University of California, for examples, must of course be considered as better officered and equipped than many of the others, especially those in the far south and southwest.

All, however, if their catalogues and the Office of Experiment Stations statistics are trustworthy, have the facilities (departments, professors and laboratories) wherewith to give instruction in the subject of foods, their composition, nutritive and economic value, methods of adulteration and detection of the same, etc.; and in the senior year or as post-graduate assistants give the students an opportunity to gain an insight into and a little actual experience in food investigation work, and also if possible, in methods of rapid legal inspection work at the local experiment station, or at least from the official chemists of these stations. The preparatory subjects, which we may consider as junior year electives, would include organic chemistry and outlines of organic analytical methods (fat extractions, melting point determinations, etc.), histological botany and microscopy and physiology, especially the subjects of nutrition, digestion and assimilation. In the senior year the really special studies would be undertaken, viz., the study of foods as previously outlined; the natural composition, nutritive and economic value, utility, methods of adulteration, etc., of foods being taught by lectures, while the methods of scientific investigation and rapid legal inspection, especially the use of the microscope and the utilization of histological botany, would be taught simultaneously in the laboratory.

Whether this senior year specialization led to a special degree, or to the ordinary bachelor's degree in science only, is immaterial. One thing is assuredly certain, however, and that is that such a comparatively simple, wholly possible and practicable course of training, especially if supplemented with actual experience in the local experiment station, would supply a national and soon to be a pressing need for competent trained 'public analysts,' similar to those regarded necessary by the smallest and least pretentious English towns and cities. Then, and then only, will our American Society of Public Analysts acquire a membership and influence sufficient to warrant its admittance as a section of the older society in the mother country or, perhaps, what is more patriotic, a similar relationship to the American Chemical Society.

R. O. BROOKS.

STATE LABORATORY OF HYGIENE,
TRENTON, N. J.

THE MISUSE OF 'FORMATION' BY ECOLOGISTS.

GEOLOGISTS, paleobotanists and a few botanists have several times called attention during the past few years to the persistent misuse by many ecologists of the word 'formation,' when referring to plant societies or associations. Regardless of the sanction of a century or more of usage for 'formation' in the geological sense, they have proceeded within the past dozen years to transplant the word, viâ Germany, into English botanical literature, unmindful of the fact that where employed in the German language it is little or not at all confusing, but when translated into English comes in direct competition with well-established usage in other fields. The usual reply to these protests has been that this employment of 'formation' has the sanction of the earlier writers in this 'newly discovered' field of ecology, and, moreover, is hardly likely to lead to any serious confusion with its use in geology, mineralogy or paleobotany. If those

who hold this view will take the trouble to look in the issue of SCIENCE for January 29, page 170, they will find enumerated a list of papers read before Section G (Botany) at the recent American Association meeting, two papers: 'Plant Formations in the Vicinity of Columbia, Mo.,' and 'The Distribution of some Iowa Plants; Formations on which they Occur.' Here, in succeeding papers, the word 'formation' is employed with two distinct meanings. The first paper, we learn from the abstract, deals with the several associations of living plants found in the locality treated of, while the second is 'A brief account of some of the more important plants found growing on the Carboniferous sandstones in eastern Iowa.' Suppose some one had read a paper, as might very appropriately have been done at the same meeting, on the 'Plants of the Potomac Formation of Maryland and Virginia,' would it be a paleobotanical, a geological or an ecological paper?

In this connection I may perhaps be pardoned for calling attention to the title of another ecological paper in the same number of SCIENCE (p. 169), viz., 'The Flora of the St. Peter Sandstone in Iowa.' This as it stands is calculated to cause a decided stir in paleobotanical circles when it is remembered that the St. Peter sandstone in Iowa is of Silurian age, and, so far as I know, has not thus far been found plant-bearing! It is only fair to add, however, that the second part of the title ('An Ecological Study') explains its scope, but the fact seems to remain that ecologists, aside from their misuse of terms, do not always sufficiently consider the titles for their papers.

F. H. KNOWLTON.

WASHINGTON, D. C.,
February 3, 1904.

SPECIAL ARTICLES.

ON TITLES FOR PAPERS.

ONE of the indirect advantages of the individual card catalogue will be that of the condensation of titles, since a man who has been often called upon to fill up several lines of a 3×5 card with the title of a four-page paper will become considerate of others, and reduce the titles of his own future articles to their lowest terms. There is in this regard the greatest disparity of usage among different authors and different schools. Thus in general it may be said that the fashion of long and ponderous titles is a characteristic of the English school, as may be seen by consulting the pages of the *Quarterly Journal* or the *Journal of Anatomy and Physiology,* in the last of which the size of the title is still farther set out by being printed entirely in large capitals. The opposite seems to be the case with Gegenbaur and his followers, as may appear by consulting the *Morphologisches Jahrbuch,* where occasionally, among others of moderate length, an exceptionally terse title meets the eye. An especially good example of this is Maurer's 'Blutgefässe im Epithel,' which another would have expanded into 'Ueber das Vorhandensein von capillaren Blutgefässe im Epithel der Mundschleimhaut bei einigen einheimischen Amphibien.' It is apparent that Gegenbaur himself set the lead in this movement, as may be seen by the titles which he employed, most of them those of masterpieces, 'Die Epiglottis,' 'Zur Morphologie des Nagels,' 'Ueber das Archipterygium,' 'Clavicula und Cleithrum,' etc.

There seem to be two main reasons for employing lengthy titles, first, the desire to show the limitations, the point of view and the treatment of the subject, giving rise to the *explanatory title,* and, secondly, the desire to appear sufficiently modest, to show how keenly one feels the vastness of the subject and how little has really been accomplished; the *modest title.*

A recent example of the first has just appeared in a leading journal, and with its twenty-four words leaves little to the imagination of the reader concerning its scope. This may well have been unavoidable in this case, but for the benefit of cataloguers it might be suggested that in such instances there might be used a title and a subtitle, the former short and for the use of the card index and general bibliographies, the other longer and more explicit, to assist the reviewers and those who have actually taken the work into their hands.

As a timely warning and to show what the outcome of this tendency may become if not

properly checked, I will quote the following, which is a masterpiece of descriptive writing, and leaves little doubt concerning the various standpoints from which the subject has been treated:

SACHS, Phil. Jacob. *Γαμμαρολογία sive gammarorum, vulgo cancrorum consideratio physico-philologico-historico-medico-chymica, in qua præter Gammarorum singularem naturam, indolens et multivarium usum non minus reliquorum crustatorum tractatio ad normam collegii naturæ curiosorum plurimis inventis secretionibus naturæ artisque locupletata.* 8vo, Francofurti et Lipsiæ, 1665.

On this head I may state as a sort of confession, that in an early article of my own I employed a title of eighteen words to designate the same number of pages. There may possibly have been reasons other than the length of the title which denied me the pleasure of seeing this article extensively quoted, but in my own later experience I know that an article of indifferent value may often be saved for a bibliography through the merit of having an easily quotable title.

Modest titles, or those in which the author acknowledges that the final word has not been said upon the subject, usually begin with 'A contribution to the study of,' 'A few points in the anatomy of,' 'Observations upon the structure and development of,' and seem to be especially popular with younger investigators. While composed in the most laudable sipirit, such titles are hardly necessary, since there is little danger of a misunderstanding on the point guarded against by the writer.

There are in all probability other forms of lengthy titles besides those touched upon here, and it is certain that titles may have numerous other defects besides length, but this article is intended as a protest, not a treatise; in short, *'a contribution to the study of the relative length of scientific titles, including an inquiry into the cause and origin of those that may be considered excessive, together with suggestions concerning the remedy for the same.'*

HARRIS HAWTHORNE WILDER.
SMITH COLLEGE,
February 6, 1904.

ELLIPTICAL HUMAN RED CORPUSCLES.

IN this short note the writer desires to place on record a peculiar anomaly in human red blood corpuscles. This interesting variation came to notice in the histological laboratory of the Ohio State University in October, 1902. The class at that time was studying the human corpuscles, and the attention of the laboratory assistant, Mr. Seymour, was attracted by the sketches made by a student who had represented the red corpuscles by elliptical outlines. Examination disclosed the fact that the colored corpuscles in the sample recently drawn by the student from his own finger were elliptical and not circular.

The student was directed to prepare another specimen, using a perfectly clean slide and cover-glass, and he followed directions closely, covering the slide as quickly as possible. The corpuscles were observed to have the same shape as before. Professor Bleile and Dr. Morrey confirmed the observation, and at Professor Bleile's suggestion numerous samples were taken by several people and the specimens invariably showed the same peculiarity. It was deemed advisable to extend the observations over a period of several weeks, subjecting the corpuscles to the action of various reagents, and also making measurements of the size of the cells.

To this end the writer carried the work on during a period of four months, specimens being taken at various intervals. The reactions to such reagents as water, dilute caustic potash, dilute acetic acid, dilute hydrochloric acid, tannic acid, etc., were normal, but in each specimen taken many cells having the abnormal shape were noted. The erythrocytes were distinctly elliptical, slightly biconcave, non-nucleated cells which did not adhere in rouleaux. In many of them the biconcavity was scarcely perceptible. It was estimated that 90 per cent. of the red cells did not have the circular outline of normal corpuscles. It was also shown that these cells were elliptical whether they were subjected to the pressure of a cover-glass or not. This seemed to be the only manner in which they differed morphologically from the normal cells, except in the slight degree of biconcavity. As this dif-

ference proved to be a permanent one, and not a variation caused by accident or error in technique, it was deemed worthy of being placed on record.

A large number of corpuscles were measured, but only the extremes and averages are here presented. They are as follows:

Shortest width observed	3.9 microns.
Greatest width observed	4.8 microns.
Shortest length observed	8.5 microns.
Greatest length observed	10.7 microns.
Average length	10.3 microns.
Average width	4.1 microns.
Ratio of width to length	1:2.5.
Average thickness	2 microns.

Thus it is seen that the outline was distinctly elliptical, the long diameter being on the average two and a half times the shorter diameter. It is also to be observed that the above figures differ considerably from those of the normal red corpuscles, which vary from 7.2 microns to 7.8 microns. The thickness was practically the same as that of the normal red corpuscles. The number was five millions per cubic millimeter and the quantity of hæmoglobin was up to the standard. The colorless corpuscles presented no peculiarities.

The student in whose blood these corpuscles were found was a healthy mulatto about twenty-two years of age. His brother, who attended the university a few years ago, had normal red blood cells. Other than this no family history is at hand.

Melvin Dresbach.

Ohio State University.

NOTES ON ENTOMOLOGY.

Auguste Barbey, an expert Swiss forester, has published a review of the Scolytidæ of central Europe.* They are treated from a systematic standpoint, but after the description of each species there is usually a considerable amount of biological matter. With each species of great destructive power is given the best means of combating it. A number of the European species also occur in the United States, so that the book will be of great value to all American students of forest insects. The excellent plates illustrate the insects and their work; several of the latter are particularly fine.

The Münchener Koleopterologische Zeitschrift is a new entomological journal, devoted to the study of palæarctic beetles. It is issued from Munich, and edited by Drs. Karl and Joseph Daniel. Volume I. (1903) is now complete and contains over 400 pages. A large majority of the articles are systematic, and consist of reviews and revisions of genera and groups, and descriptions of new species and varieties. This volume contains Dr. Ganglbauer's notable classification of the coleoptera. He criticizes the recent classifications of Lameere and Kolbe, and presents a new one, which, in general, is like that of LeConte and Horn (1883). There are seven leading groups of families, but the groups Clavicornia and Serricornia of those authors are arranged under the groups Staphylinoidea and Diversicornia. It would appear, however, even from the names of some of the groups, that a logical classification of the beetles is a thing only to be hoped for.

The British Museum of Natural History has issued an elaborate account of the African tse-tse flies, prepared by Mr. E. E. Austen.* The fact that one species (*G. morsitans*) carries the germs of the Nagana disease lends great interest to the study of these flies. This disease, so fatal to domestic animals, was supposed to be due to a poison injected by the bite of the tse-tse fly. All travelers in those regions have been delayed or disheartened by its ravages in their animals. And Mr. Austen suggests that were it not for the tse-tse fly, the entire history of South Africa would have been different. Although as long ago as 1879 it was suspected that the tse-tse fly was merely the carrier of a blood-parasite, it was not so proved until 1895 by Col. Bruce. This parasite was then described by Plimmer and Bradford as *Trypanosoma brucei*. Mr. Austen devotes many pages to the recital of the ravages of the disease, quoting from many works of travel. Detailed technical descriptions are given of the seven species of the genus, one of

* 'Les Scolytides de l'Europe Centrale,' Geneva, folio, 120 pp., 18 plates (also a German edition).

* 'A Monograph of the Tse-tse Flies (*Glossina*),' with a chapter on the mouthparts, by H. J. Hansen, London, 1903, pp. 319, 9 pls.

which is new. The beautiful plates illustrate the species. Dr. Hansen has described the mouth-parts and compared them to the allied genus, *Stomoxys*, the stable-fly of this country and Europe. A map is given showing the known distribution of *Glossina* in Africa.

It may be added that Lieut. Col. Bruce, who worked out the life history of the trypanosome of Nagana, has lately discovered that another species of tse-tse fly, *G. palpalis*, is the carrier of the trypanosome of sleeping sickness.

Dr. Adolph Lutz has published an account of the life history of an injurious Brazilian *Anopheles*.* This mosquito, which is the carrier of the germ of an intermittent fever, is a small species of *Anopheles, A. lutzi* Theobald. In the locality where the sickness occurred there are very few pools of stagnant water. Dr. Lutz, therefore, sought for other breeding places, and found the larva of this species in the cavities of various epiphytic plants of the family Bromeliaceæ. He also found the larva of a *Megarhinus* feeding upon the other culicid larvæ. Two species of *Culex* were also bred from the water in the cavities of these plants. The article shows the difficulty in the tropics of localizing the breeding places of mosquitoes.

Mr. C. T. Brues has added considerably to our limited knowledge of the Stylopidæ.† From Texan species of *Polistes* which he kept in confinement he obtained females and bred males of two new species of *Xenos* (*X. pallidus* and *X. nigrescens*). Upon these, and a large series of *X. pecki* collected in Connecticut by Dr. Wheeler, Mr. Brues has made a study, principally of the early stages of the embryo and the origin of the eggs. He finds no similarity between the Stylopidæ and the Coleoptera, and concludes that the former should form a separate order of insects—the Strepsiptera.

The second volume of Bingham's 'Hymenoptera of British India'* contains the ants and cuckoo (or golden) wasps. There are 398 species of ants described, representing probably one of the largest ant-faunas in the world. There are many notes of a very interesting nature on the habits of some of the ants. Of the cuckoo-wasps (Chrysididæ) 79 species are described. The colored plate shows some of these handsome insects.

Dr. J. Vosseler has given an attractive account of his studies on the Orthoptera of Algeria and Tunis.† The first part contains notes on the physical condition of the country, the rôle of wind in the distribution of the forms, and an annotated catalogue of the species (224 in number). Part second has a chapter on the distribution of these species in the Mediterranean fauna, one on the markings and adaptive appearances in Acridiidæ, notes on the squirting of blood by various species, and on the odor-glands in one genus —*Œdaleus*.

The squirting of blood, or the body-fluid, is considered as a means of defense. In *Eugaster* there is a hole in the legs near the coxa through which the blood is forced; in *Platystolus* there is a slit at the posterior part of the pronotum. Many of the species are confined to desert regions, and of these a number are protectively colored when at rest, yet when flying display the brilliant colors on their hind wings. Some of the species vary considerably, and one colored plate is devoted to the variations in *Eremobia crista* Fabr.

Dr. C. G. Attems has published a synopsis of the geophilid myriapods of the world.‡ It consists of a chapter on the structure of the family, a synopsis to genera and species of the palæarctic forms, a catalogue of the species of other countries, and descriptions of many new species, mostly non-European. Altogether about 290 species are mentioned.

* 'Waldmosquitos und Waldmalaria,' *Centralbl. f. Bakter. Parasitenk. u. Infektionskrankheiten*, Bd. XXXIII., pp. 282–292, 1903, figs.

† 'A Contribution to our knowledge of the Stylopidæ,' *Zool. Jahrb., Abt. f. Anat.*, Vol. XVIII., pp. 241–270, 1903.

* 'The Fauna of British India, including Ceylon and Burma; Hymenoptera,' Vol. II., London, 1903, 506 pp., 1 pl., 161 figs.

† 'Beiträge zur Faunistik und Biologie der Orthopteren Algeriens und Tunesiens,' *Zool. Jahr.*, Abt. f. Syst., Vol. XVI., pp. 338–404, 2 pls.; Vol. XVII., pp. 1–98, 3 pls., 1902.

‡ 'Synopsis der Geophiliden,' *Zool. Jahr.*, Abt. f. Syst., Vol. XVIII., pp. 155–302, 6 pls., 1903.

Dr. J. C. Nielsen has two papers in the same volume of the same periodical. One treats of the development of *Bombylius pumilus*, a fly parasitic in the nest of a bee—*Colletes daviesiana*. He shows that when the *Bombylius* is ready to issue the pupa bores through the earth, and does not follow the channel of the nest. The second article is on the life-history of the longicorn beetle, *Oberea linearis*. The female beetle, after the manner of our Oncideres, cuts off the twig of hazel just beyond where it has deposited an egg. It takes two years for the young to reach maturity.

About two years ago a French woman, Marie Pellechet, offered a prize for a work on the insects injurious to books and their bindings. The committee in charge of the prize awarded it to Constant V. Houlbert, and his essay has been published.* It is the most complete work yet written on the subject. He treats of 60 different species, and gives remedies or means of prevention as far as known. There is a bibliography of 94 numbers, from which the author has drawn for most of his facts. He finds that the worst insect enemies of books are the species of *Anobium* and allied genera, known to the French as 'Vrillettes.' The remedy chiefly advised is fumigation, based on American methods.

NATHAN BANKS.

THE EIGHTH INTERNATIONAL GEOGRAPHIC CONGRESS, WASHINGTON, 1904.

THE executive committee of the Seventh International Geographic Congress, held in Berlin in 1899, having voted to convoke its next session in Washington, the National Geographic Society, as the organization responsible for the management of the sessions in the United States, will welcome the eighth congress and its friends to the national capital of the United States in September, 1904.

Geographers and promoters of geography throughout the world, especially members of geographic societies and cognate institutions of scientific character, are cordially invited to assemble in Washington, D. C., on September 8, 1904, for the first international meeting of geographers in the western hemisphere.

* 'Les insectes ennemis des livres,' pp. 269 + 38, 3 pls., 59 figs., Paris, 1903.

On the invitation of the National Geographic Society, the following societies join in welcoming the congress and undertake to cooperate toward its success, especially in so far as sessions to be held in their respective cities are concerned:

The American Geographical Society.
The Geographic Society of Baltimore.
The Geographic Society of Chicago.
The Geographical Society of California.
The Mazamas.
The Peary Arctic Club.
The Geographical Society of Philadelphia.
The Appalachian Mountain Club.
The Geographical Society of the Pacific.
The Sierra Club.
The American Alpine Club.
The Harvard Travellers Club.

The congress will convene in Washington on Thursday, September 8, in the new home of the National Geographic Society, and will hold sessions on the ninth and tenth, the latter under the auspices of the Geographic Society of Baltimore. Leaving Washington on the twelfth, the members, associates and guests of the congress will be entertained during that day by the Geographical Society of Philadelphia, and on the thirteenth, fourteenth and fifteenth by the American Geographical Society of New York, where scientific sessions will be held; on the sixteenth they will have the opportunity of visiting Niagara Falls (*en route* westward by special train), and on the seventeenth will be entertained by the Geographic Society of Chicago; and on Monday and Tuesday, September 19 and 20, they will be invited to participate in the International Congress of Arts and Science connected with the World's Fair in St. Louis. Arrangements will be made here for visiting exhibits of geographic interest. In case any considerable number of members and associates so desire, a far-west excursion will be provided from St. Louis to the City of Mexico, thence to Santa Fé, thence to the Grand Canyon of the Colorado, and on to San Francisco and the Golden Gate, where the western geographic societies will extend special hospitality, afterward returning by any preferred route through the Rocky Mountains and the interior plains to the eastern ports.

If the membership and finances warrant, the foreign delegates will be made guests of the congress from Washington to St. Louis, *viâ* Baltimore, Philadelphia, New York, Niagara Falls and Chicago. On the far-west excursion special terms will be secured, reducing the aggregate cost of transportation, with sleeping-car accommodations, and meals, materially below the customary rates. It may be necessary to limit the number of persons on the far-west excursion. It is planned also to secure special rates for transportation of foreign members from one or more European ports to New York, provided requisite information as to the convenience and pleasure of such members be obtained in time. Final information on these points will be given in the preliminary program of June, 1904.

The subjects for treatment and discussion in the congress may be classified as follows:

1. Physical geography, including geomorphology, meteorology, hydrology, etc.
2. Mathematical geography, including geodesy and geophysics.
3. Biogeography, including botany and zoology in their geographic aspects.
4. Anthropogeography, including ethnology.
5. Descriptive geography, including explorations and surveys.
6. Geographic technology, including cartography, bibliography, etc.
7. Commercial and industrial geography.
8. History of geography.
9. Geographic education.

A special opportunity will be afforded for the discussion of methods of surveying and map-making, and for the comparison of these methods as pursued in other countries with the work of the federal and state surveys maintained in this country.

Members of the congress will be entitled to participate in all sessions and excursions, and to attend all social meetings in honor of the congress; they will also (whether in attendance or not) receive the publications of the congress, including the daily program and the final *Compte Rendu*, or volume of proceedings. Membership may be acquired by members of geographic and cognate societies on payment of $5 (25 francs, one pound, or 20 Marks) to the committee of arrangements. Persons not members of such societies may acquire membership by a similar payment and election by the presidency. Ladies and minors accompanying members may be registered as associates on payment of $2.50 (12½ francs 10 shillings, or 10 Marks); they shall enjoy all privileges of members except the rights of voting and of receiving publications.

Geographers and their friends desirous of attending the congress or receiving its publications are requested to signify their intention at the earliest practicable date, in order that subsequent announcements may be sent them without delay and that requisite arrangements for transportation may be effected. On receipt of subscriptions, members and associates' tickets will be mailed to the subscribers. The privileges of the congress, including the excursions and the social gatherings, can be extended only to holders of tickets.

It is earnestly hoped that the congress of 1904 may be an assemblage of geographic and cognate institutions no less than of individual geographers; and to this end a special invitation is extended to such organizations to participate in the congress through delegates on the basis of one for each one hundred members up to a maximum of ten. No charge will be made for the registration of institutions, though the delegates will be expected to subscribe as members; and in order that the list of affiliated institutions (to be issued in a later announcement) may be worthy of full confidence, the committee of arrangements reserves the right to withhold the name of any institution pending action by the presidency. The publications of the congress will be sent free to all institutions registered. It is especially desired that the geographic societies of the western hemisphere may utilize the opportunity afforded by this congress for establishing closer relations with those of the old world, and to facilitate this, Spanish will be recognized as one of the languages of the congress, with French, English, German and Italian, in accordance with previous usage; and communications before the congress may be written in any of these languages.

Institutions not strictly geographic in character, libraries, universities, academies of sci-

ence and scientific societies are especially invited to subscribe as members in order to receive the publications of the congress as issued.

Members and delegates desirous of presenting communications before the congress or wishing to propose subjects for discussion are requested to signify their wishes at the earliest practicable date, in order that the titles or subjects may be incorporated in a preliminary program to be issued in June, 1904. The time required for presenting communications should be stated, otherwise twelve minutes will be allotted. It is anticipated that not more than twenty minutes can be allotted for any communication unless the presidency decide to extend the time by reason of the general interest or importance of the subject. The presidency with the complete organization of the congress will be announced in the preliminary program of June, 1904.

All papers or abstracts designed for presentation before the congress, and all proposals and applications affecting the congress, will be submitted to a program committee, who shall decide whether the same are appropriate for incorporation in the announcements, though the decisions of this committee shall be subject to revision by the presidency after the congress convenes.

Any proposal affecting the organization of the congress or the program for the Washington session must be received in writing not later than May 1, 1904. Communications designed to be printed in connection with the congress must be received not later than June 1, and any abstracts of communications (not exceeding 300 words in length) designed for printing in the general program to be published at the beginning of the congress must be received not later than August 1, 1904. Daily programs will be issued during the sessions.

All correspondence relating to the congress and all remittances should be addressed to the Eighth International Geographic Congress, Hubbard Memorial Hall, Washington, D. C., U. S. A.

Committee of Arrangements—W J McGee, National Geographic Society, *chairman;* Henry G. Bryant, Geographical Society of Philadelphia; George B. Shattuck, Geographic Society of Baltimore; A. Lawrence Rotch, Appalachian Mountain Club, Boston; Zonia Baber, Geographic Society of Chicago; George Davidson, Geographical Society of the Pacific, San Francisco; Frederick W. D'Evelyn, Geographical Society of California, San Francisco; John Muir, Sierra Club, San Francisco; Rodney L. Glisan, Mazamas, Portland; Angelo Heilprin, American Alpine Club; Herbert L. Bridgman, Peary Arctic Club; William Morris Davis, Harvard Travellers Club; J. H. McCormick, *secretary.*

Finance Committee—John Joy Edson, *chairman,* president Washington Loan and Trust Company; David T. Day, United States Geological Survey; Charles J. Bell president American Security and Trust Company.

THE SIXTH INTERNATIONAL CONGRESS OF ZOOLOGY.

The Fifth International Congress of Zoology held at Berlin in 1901, selected Switzerland as the place of meeting for the sixth session, and elected Professor Doctor Th. Studer president.

The congress will meet at Bern from August 14–19, 1904.

The general committee consists of the following gentlemen:

President—Dr. Th. Studer, professor at the University of Bern.

Vice-Presidents—Dr. E. Beraneck, professor at the Academy of Neuchâtel; Dr. H. Blanc, professor at the University of Lausanne; Dr. V. Fatio, Geneve; Dr. L. Kathariner, professor at the University of Fribourg; Dr. A. Lang, professor at the University and at the Polytecknicum of Zurich; Dr. E. Yung, professor at the University of Geneva; Dr. F. Zschokke, professor at the University of Bâsle.

General Secretary of the Standing Committee of International Congresses of Zoology—Dr. R. Blanchard, professor of the Medical Faculty of Paris.

Secretaries—Dr. M. Bedot, professor at the University of Geneva; Dr. T. Carl, assistant to the Museum of Natural History of Geneva; Dr. W. Volz, assistant to the Zoological Institute of the University of Bern.

Treasurers—Mr. E. Von Büren von Salis, banker, Bern, and Mr. A. Pictet, banker, Geneva.

Committee on Scientific Works—Besides the president and the vice-presidents of the general committee: *President*—Dr. H. Strasser, professor

at the University of Bern; Dr. E. Bugnion, professor at the University of Lausanne; Dr. R. Burckhardt, professor at the University of Bâsle; Dr. H. Corning, professor at the University of Bâsle; Dr. U. Duerst, privatdocent at the University of Zürich; Dr. A. Forel, professor, Chigny; Dr. F. Sarasin, Bâsle; Dr. Sarasin, Bâsle; Dr. H. Stehlin, Bâsle.

Committee on Finances: President—Mr. E. Von Büren von Salis, Bern.

Committee on Publications: President—Dr. M. Bedot, professor at the University of Geneva.

Committee on Receptions: President—Dr. H. Kronecker, professor at the University of Bern.

Committee on Lodgings—Dr. E. Hess, professor at the University of Bern.

Committee on Entertainments—Dr. O. Rubeli, professor at the University of Bern.

Committee on Refreshments—Dr. H. Graf, professor at the University of Bern.

Press Committee—Dr. G. Beck, Bern.

The general meeting will take place at Bern in the Palace of Parliament, and the section sittings in the new university.

During the congress there will be an excursion to Neuchâtel and to the Zura lakes, in order to visit the lake-dwellers' settlements.

The closing session of the congress will be held at Interlaken. Afterwards, the members of the congress will be invited to visit other Swiss cities. Concerning intended communications, inquiries, etc., address the president of the Sixth International Congress, Museum of Natural History, Waisenhausstrasse, Bern.

The congress is open to all zoologists and to those interested in zoology.

THE DEDICATION OF PALMER HALL, COLORADO COLLEGE.

PALMER HALL, the new science and administration building of Colorado College, at Colorado Springs, was formally dedicated on February 23, the dedicatory address being delivered by Dr. David Starr Jordan. The new building, which cost about $280,000, is 287 feet long and 95 feet wide. Besides a sub-basement six feet high, there are three stories, a basement and a first and second floor. The style of architecture is that which has been chosen for the entire system of buildings eventually to occupy the college campus, the first example of which was presented in the Coburn Library. The structure is built of the 'peach blow' sandstone of Colorado, and is fire-proof, with steel frame and concrete floors, overlaid with terazzo finish. In the basement are laboratories for chemistry, physics and psycho-physics, and a large demonstration room. On the first floor are the executive offices, general lecture rooms, other laboratories for chemistry and physics, the lecture room of the department of sociology, etc. On the second floor are the museum, and the departments of biology and geology, etc. An endowment of $50,000 has been provided for the building, and the equipment to date has cost about $30,000. These sums, of course, are wholly inadequate. The members of the staff of Colorado College (including Cutler Academy) whose work is more especially connected with science are as follows: Dr. W. F. Slocum, president and head professor of philosophy; Dr. F. Cajori, dean of the engineering school and head professor of mathematics; Dr. E. G. Lancaster, assistant professor of philosophy and pedagogy; Dr. F. H. Lond, professor of mathematics and astronomy; Professor W. Strieby, professor of chemistry and metallurgy; Mr. M. F. Coolbaugh, instructor in chemistry; Dr. E. C. Schneider, professor of biology; Dr. W. C. Sturgis, lecturer on botany; Dr. G. I. Finlay, professor of geology, mineralogy and paleontology; Dr. T. K. Urdahl, professor of political and social science; Dr. J. C. Shedd, professor of physics; Mr. F. R. Hastings, lecturer on the history of philosophy; Miss E. P. Hubbard, instructor in mathematics; Mrs. W. P. Cockerell, instructor in botany in Cutler Academy; Mr. T. D. A. Cockerell, curator of the museum.

In addition to the dedicatory exercises proper, addresses were delivered on February 22 by Dr. C. R. Van Hise, on 'Colorado as a Field for Scientific Research'; by Dr. S. L. Bigelow, on 'The Growth and Function of the Modern Laboratory'; by Dr. C. E. Bessey, on 'The Possibilities of the Botanical Laboratory,' and by Dr. Henry Crew, on 'Recent Advances in the Teaching of Physics.' In connection with the exercises, the degree of LL.D. was conferred on General William J. Palmer, in whose honor Palmer Hall was

named. General Palmer is one of the principal founders of Colorado Springs, and has probably had more to do with the upbuilding of Colorado than any other one man. He has during many years aided the college in innumerable ways, and is one of its trustees.

Colorado College does not pretend to be a university, and in fact always has insisted on the college ideal as distinguished from that of the university proper. Nevertheless Dr. Jordan, in his address, spoke the following significant words:

"I am told that Colorado College is one of those which aspires to be only a college, a thoroughly good college of course, but that she has no thought of becoming a university. I do not learn this from my friend, Dr. Slocum, and I know that his ambition is boundless. But whether it be true or not, I am going to oppose the idea. She will be a university before you know it. This Palmer Hall may be offered in evidence that the college period is past. Colorado College has already become a university. A university in embryo, perhaps, if you like, but still with all the marks by which the university is known—as certain to become a university in fact as a pine seedling on your royal hills is sure some day to become a pine tree.

"A university in America is a place where men think lofty thoughts, and where men test for themselves that which seems to be true, where men go up to the edge of things and look outward into the great unknown, where men find their life work."

And, it may be added, it appears to be universally expected and desired by those who insist upon the word college that the opening of Palmer Hall shall mark the beginning of a period of scientific research, the extent of which is only to be limited by the men and materials available.

T. D. A. C.

THE STUDY OF SCIENCE.

The secretaries of the Royal Society have submitted to the universities of the United Kingdom the following 'Statement regarding Scientific Education in Schools, drawn up by a Committee of the Royal Society':

"Notwithstanding efforts extending over more than half a century, it still remains substantially true that the public schools have devised for themselves no adequate way of assimilating into their system of education the principles and methods of science. The experience of 'modern sides' and other arrangements shows that it can hardly be expected that, without external stimulus and assistance, a type of public-school education can be evolved which, whilst retaining literary culture, will at the same time broaden it by scientific interests. On the other hand, it is admitted that many students trained in the recent foundations for technical scientific instruction have remained ignorant of essential subjects of general education.

"The bodies which can do most to promote and encourage improvement in these matters are the universities, through the influence which they are in a position to exert on secondary education. This improvement will not, however, be brought about by making the avenues to degrees in scientific or other subjects easier than at present. Rather, the test of preliminary general education is too slight already, with the result that a wide gap is often established between scientific students careless of literary form and other students ignorant of scientific method.

"It may be suggested that the universities might expand and improve their general tests, so as to make them correspond with the education, both literary and scientific, which a student, matriculating at the age of nineteen years, should be expected to have acquired; and that they should themselves make provision, in cases where this test is not satisfied, for ensuring the completion of the general education of their students, before close specialization is allowed.

"In particular, it appears desirable that some means should be found for giving a wider range of attainment to students preparing for the profession of teaching. The result of the existing system is usually to place the supreme control of a public school in the hands of a head master who has little knowledge of the scientific side of education; while the instructors in many colleges have to deal

with students who have had no training in the exact and orderly expression of their ideas.

"Our main intention is not, however, to offer detailed suggestions, but to express our belief that this question of the adaptation of secondary education to modern conditions involves problems that should not be left to individual effort, or even to public legislative control; that it is rather a subject in which the universities of the United Kingdom might be expected to lead the way and exert their powerful influence for the benefit of the nation."

SCIENTIFIC NOTES AND NEWS.

BY order of its council the next meeting of the Astronomical and Astrophysical Society of America will be held in affiliation with the American Association for the Advancement of Science, at Philadelphia, during convocation week, 1904–05.

DR. ALEXANDER AGASSIZ, director of the Harvard University Museum and president of the National Academy of Sciences, has been advanced to a foreign associate of the Paris Academy of Sciences, to fill the vacancy caused by the death of Sir George Gabriel Stokes.

MCGILL UNIVERSITY has conferred the degree of LL.D. on Dr. Edward L. Trudeau of Saranac Lake, N. Y., in recognition of his work on the open-air treatment of tuberculosis, and on Mr. Edward Weston, of Newark, N. J., the investigator and inventor in electrical science.

PROFESSOR W. OSTWALD, of Leipzig, has been elected an honorary member of the Society of Scientific Men at Moscow.

THE University of Utrecht has conferred an honorary doctorate of medicine on Professor J. H. van't Hoff, of Berlin.

PROFESSOR G. H. DARWIN, of Cambridge, has been elected a foreign associate of the Belgian Academy of Sciences.

LORD KELVIN is one of three nominees for the chancelorship of the University of Glasgow.

PRESIDENT JORDAN, of Stanford University, is expected to join the *Albatross* on about April 10 to make a biological examination of Monterey Bay. Professor W. E. Ritter, of the University of California, is at present carrying on a survey of the coast between San Diego and Catalina Island, under the general direction of President Jordan.

REAR ADMIRAL GEORGE W. MELVILLE, U.S.N. (retired), and Mr. George Westinghouse arrived in Paris at the beginning of March after an extended European trip. The former is making an investigation of the extent to which turbine engines are being applied in naval construction.

PROFESSOR H. C. ERNST, of the Harvard Medical School, has recently appeared before a committee of the Massachusetts legislature in opposition to the bill to restrict animal experimentation in the state.

DURING the summer Assistant Professor J. O. Snyder, of Stanford University, will undertake for the government an examination of the rivers and streams of northwestern California, Nevada and Oregon.

DR. W. R. BRINCKERHOFF and Dr. E. E. Tozzer, of the Harvard Medical School, members of the expedition to the Philippines sent out under the direction of Dr. Councilman, have arrived in Manila.

PROFESSOR FREDERIC S. LEE, who has recently been promoted to a full professorship of physiology at Columbia University, has been granted leave of absence for the academic year of 1904–5, and will spend the time in European laboratories.

SIR DAVID GILL, director of the Royal Observatory at the Cape of Good Hope, is on a visit to Great Britain.

IT is stated in the newspapers that Professor E. P. Lewis, of the University of California, has received a grant of $500 from the Carnegie Institution to purchase prisms and lenses for the study of the spectra of gases under different physical conditions.

SIR WILLIAM HUGGINS, president of the Royal Society, celebrated his eightieth birthday on February 7.

DR. AUGUST DÖRING, titular professor of philosophy at Berlin, has celebrated his seventieth birthday.

Professor Kuno Fischer, of Heidelberg, will not retire, as has been announced, but offers this summer four lectures a week on 'The History of Modern Philosophy.'

At the instance of Professor John Marshall and Professor Edgar F. Smith, of the University of Pennsylvania, thirty-four Americans, who formerly studied chemistry at the University of Göttingen, have united to send a gift to Heinrich Mahlmann, who is celebrating his fiftieth year of service as 'Diener' in the Chemical Laboratory at Göttingen.

Dr. Henry F. Osborn, of Columbia University and the American Museum of Natural History, lectured before the Academy of Science and Art at Pittsburg in the Carnegie Institute on March 10, his subject being 'The Evolution of the Horse.'

We regret to record the deaths of Dr. Magnus Blix, professor of physiology at the University of Lund, at the age of fifty-five years; of Dr. Ludwig Beushausen, docent for geology and paleontology at the Berlin School of Mines, at the age of forty-one years, and of Professor F. S. Schmitt, director of the Natural History Museum at Stockholm.

The St. Petersburg Academy of Science has offered $3,750 for information in regard to the party of Baron Toll, the Arctic explorer, from whom nothing has been heard since he left the yacht *Zaria*, in 1902, and started for Bennett Island.

Several subscriptions are announced for the Institute of Medical Sciences, to be established under the auspices of the University of London, the largest of which is $25,000 from Mr. Alfred Beit.

The American Electrochemical Society will hold its fifth general meeting at Columbian University, Washington, D. C., on April 7, 8 and 9. The headquarters wil be at the Shoreham Hotel. The chairman of the local committee is Colonel Samuel Reber, and the chairman of the executive committee, Dr. H. W. Wiley.

The Southern Society for Philosophy and Psychology was organized on February 23 in Atlanta, Ga. Its officers are: *President*, Professor J. Mark Baldwin, Johns Hopkins University; *Secretary*, Professor Edward Franklin Buchner, University of Alabama; *Council*, the president, secretary, Dr. William T. Harris, Washington, D. C., Mr. Reuben Post Halleck, Louisville, Ky., and Professor A. Casewell Ellis, University of Texas. The aim of the organization is to promote the welfare of philosophy and psychology in southern institutions.

We are requested to state again that the Association for maintaining the American Women's Table at the Zoological Station at Naples and for promoting Scientific Research by Women announces the offer of a second prize of one thousand dollars for the best thesis written by a woman on a scientific subject, embodying new observations and new conclusions based on an independent laboratory research in biological, chemical or physical science. The theses offered in competition are to be presented to the executive committee of the association and must be in the hands of the chairman of the committee on the prize, Mrs. Ellen H. Richards, Massachusetts Institute of Technology, Boston, Mass., before December 31, 1904. The prize will be awarded at the annual meeting in April, 1905.

We learn from *The Observatory* that an observatory has been established at Zagreb, the capital of Croatia (Hungary), under the direction of Professor Otto Kucera. This institution, which is an offshoot of the Croatian Philosophical Society, established in 1887, aims at doing good astronomical work as well as popularizing the science in Croatia. It already possesses equatorials of 6.4 inches and 4.25 inches aperture, as well as other instruments, and with these it is proposed to observe the sun and planets, and variable and colored stars.

A parliamentary paper has been published relating to the proposed adoption of a metric system of weights and measures for use within the British empire. The London *Times* states that in a circular sent from the Colonial Office, dated December 9, 1902, the colonial governors were asked to say what action was likely to be taken in their respective colonies with regard to the resolution adopted at the

Conference of Colonial Premiers in London in favor of the adoption of a metric system. The replies received are thus summarized. The metric system is already used in Mauritius and Seychelles. The following are favorable to its adoption: Australia, New Zealand, Cape of Good Hope, Transvaal, Orange River Colony, Southern Rhodesia, Gambia, Northern Nigeria, Gibraltar, British Guiana, Trinidad, Leeward Islands, Windward Islands. Also, with a reservation that it must also be adopted in the United Kingdom or in the empire generally, Sierra Leone, Southern Nigeria, Ceylon and Falklands. Hongkong would take common action with other colonies. The states of New South Wales, Victoria and Western Australia are also favorable, but, together with South Australia and Tasmania, consider that the matter is one for the Commonwealth Government. Fiji is doubtful, but must follow Australia and New Zealand. British New Guinea would go with Australia. Jamaica and British Honduras need the adoption of the system in the United States of America. The practise of India is important to the Straits Settlements, which would be followed by Labuan; and the Bechuanaland Protectorate would follow the rest of South Africa. St. Helena, Cyprus, Lagos, Wei-hai-wei, Barbados and Bahamas are on the whole unfavorable. The Gold Coast Colony and the state of Queensland are prepared to adopt the system, but consider that inconvenience would occur. Natal can not consider the matter until some general lines of legislation have been agreed upon. No definite answer has been given by Newfoundland, Malta or Bermuda. Canada has not yet replied.

THE forthcoming annual volume of 'Mineral Resources' published by the U. S. Geological Survey will contain a report of Mr. F. H. Oliphant on the production of petroleum in 1902. Seven facts with reference to the petroleum industry of 1902 are emphasized in this report. (1) The production of crude petroleum, which amounted to 88,757,395 barrels, was greater than that of any previous year. (2) The great increase was due principally to the development of an inferior grade of petroleum in Texas, California and Louisiana. (3) There was a slight decrease in the production of the Appalachian field and a slight increase in the Lima-Indiana field, caused by the increased production in the state of Indiana. (4) The general average price paid for the crude petroleum produced was less than in any year since 1898, although the average price for the better grades produced in the Appalachian and the Lima-Indiana fields was four cents greater in 1902 than in 1901. (5) Stocks held in the Appalachian and Lima-Indiana fields showed a considerable decrease, principally in the Appalachian field. (6) The amount of refined and crude petroleum exported in 1902 was slightly less than that of 1901. There was an increase in the amount of crude petroleum and residuum exported, a decrease in illuminating petroleum, and an increase in lubricating petroleum. While the quantity of exports of all grades decreased only 1.37 per cent., the value decreased 5.62 per cent. The home consumption has been increasing more rapidly in the last three years than it did in former years. (7) No new pools were discovered in 1902. Indications point to the existence of a new source of petroleum supply in Alaska.

UNIVERSITY AND EDUCATIONAL NEWS.

THE College of Pharmacy of the City of New York, established in 1831, and possessing a well-equipped building on Sixty-eighth St., has become a part of Columbia University. President Butler becomes president of the college, which, however, remains a separate corporation, its finances being managed by its own board of trustees, as is the case with Teachers College and Barnard College. It is also announced that Columbia University has received an additional sum of $50,000, making $350,000 in all, for Hartley Hall, and will proceed to erect this and another dormitory on the Amsterdam side of South Field.

PRINCETON UNIVERSITY has received gifts of the value of $35,000, including $15,000 from Mr. Morris K. Jesup, to increase the endowment fund bearing his name.

Announcement is made in the *N. Y. Evening Post* in regard to the celebration of the jubilee of the University of Wisconsin, and the inauguration of President Van Hise. Wednesday, June 8, will be 'semi-centennial' day. An address of congratulation on behalf of the American universities will be delivered by Dr. Daniel C. Gilman, president of the Carnegie Institution. The universities of the far west, the south and the middle west will be represented respectively by President Benjamin Ide Wheeler, of the University of California, President R. H. Jesse, of the University of Missouri, and President Cyrus Northrop, of the University of Minnesota. President James B. Angell, of the University of Michigan, will deliver an address on the function of the State University. The inauguration of the president, Charles R. Van Hise, the eminent geologist, will occur on Tuesday, June 7. President William R. Harper of Chicago University will present the greetings of other American universities. Governor La Follette, a classmate of Dr. Van Hise, will welcome him to the presidency, and Professor Frederick J. Turner, '84, will respond on the part of the faculty. The state superintendent of public instruction, Mr. Cary, will make an address on the western educational system, which makes the state university the crown of the public school system.

A cablegram to daily papers states that the University of Vienna has been closed in consequence of threats of disturbances among the students. The German students were much incensed at the demonstrations of the Czechs against their German comrades at Prague, Bohemia, and threatened retaliation.

A scholarship valued at $150.00 has recently been established in the New Mexico School of Mines, open to the best member of the graduating class of each year, desiring to make a special study of mining machinery in the large manufacturing works.

Dr. Andrew S. Draper has resigned the presidency of the University of Illinois to become commissioner of education of New York State. This is a result of the unification bill which was signed by Governor Odell on March 8. Under the new organization the eleven regents and their terms of office are as follows: Whitelaw Reid, nine years; Edward Lauterbach, seven years; Eugene A. Philbin, five years; Charles A. Gardner, six years; St. Clair McKelway, two years; Dr. Albert Vander Veer, one year; Charles S. Francis, eleven years; William Nottingham, three years; Daniel Beach, four years; Pliny T. Sexton, ten years; T. Guilford Smith, eight years.

Professor Frank Thilly, of the University of Missouri, has been elected to the Stuart chair of psychology at Princeton University, vacant by the removal of Professor J. Mark Baldwin to the Johns Hopkins University.

Owing to the continued illness of Professor John Krom Rees, of Columbia University, he will be absent with leave for the year 1904–5. The trustees have made Adjunct Professor Harold Jacoby professor and acting head of the department of astronomy during Professor Rees's absence. Charles L. Poor, Ph.D., formerly assistant professor of astronomy in the Johns Hopkins University, is also made professor of astronomy. The following adjunct professors have been promoted to professorships: Frederic S. Lee, Ph.D., to be professor of physiology; Edmund H. Miller, Ph.D., to be professor of analytical chemistry; Marston T. Bogert, Ph.D., to be professor of organic chemistry; Bashford Dean, Ph.D., to be professor of vertebrate zoology; Cary N. Calkins, Ph.D., to be professor of zoology, and H. E. Crampton, Ph.D., to be professor of zoology at Barnard College. The following instructors have been made adjunct professors: Eugene Hodenpyl, M.D., in pathological anatomy; Francis C. Wood, M.D., in clinical pathology; Frederick R. Bailey, M.D., in normal histology; Lea McI. Luquer, Ph.D., in mineralogy; and Bradley Stoughton, B.S., in metallurgy.

Dr. Th. Ziehen, of Halle, has been called to the chair of psychiatry at Berlin vacated by the death of Dr. F. Jolly.

The Isaac Newton studentship at Cambridge University, of the value of £250, for study and research in astronomy has been awarded to Zia Uddin Ahmad, B.A., of Trinity College.